

02716.0005.NPUS01.ST25.txt  
SEQUENCE LISTING

<110> JENSEN, Rasmus B.  
KELEMEN, Bradley

<120> PROTEORHODOPSIN MUTANTS WITH IMPROVED OPTICAL CHARACTERISTICS

<130> 02716.0005.NPUS01

<150> 60/429,518

<151> 2002-11-26

<160> 212

<170> PatentIn version 3.2

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<212> PRT

<213> Marine eubacteria

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Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
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Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
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Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
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Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
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Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
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Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr Val  
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Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met Arg  
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Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr Ile  
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Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu Ile  
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Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu Leu  
115 120 125

Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala Gly  
130 135 140

Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp Val  
145 150 155 160

Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys Asn  
165 170 175

Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr Ile  
180 185 190

Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly Tyr  
195 200 205

Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr Asn  
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Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr val ser Gly Leu val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Ala Gly Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gly Ile Met Asn Ala Trp Gly Ala Phe Val Ile Gly Cys Leu Ala  
 145 150 155 160

Trp val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ala Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
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Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
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Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
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Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
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Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Ala Gly Leu Phe Lys Lys  
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Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
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Ala Gly Ile Met Asn Ala Trp Gly Ala Phe Val Ile Gly Cys Leu Ala  
145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ala Ala  
165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
180 185 190

Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
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Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
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Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
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Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
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Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
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Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
165 170 175

Cys Asn Thr Ala Ser Pro Ser Val Gln Ser Ala Tyr Asn Thr Met Met  
180 185 190

Ala Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Ile Gly Tyr Phe Thr  
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Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
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Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
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Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110



Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Ala Gly Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
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Ala Gly Ile Met Asn Ala Trp Gly Ala Phe Val Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ala Ala  
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Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
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Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
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Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
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 35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
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Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
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Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
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Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
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Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu His Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Lys Ile Ile Val Ile Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 Page 10

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Gly Tyr Leu Met Ser Gly Asp Gly Val Tyr Ala Ser Asn Leu Asn Leu  
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Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
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Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
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Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Val Val Glu Phe Tyr  
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Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
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Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
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Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
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Leu Ile Leu Ala Ala Cys Thr Asn Val Ala Ala Ser Leu Phe Lys Lys  
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Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
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Val Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
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Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
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 <212> PRT  
 <213> Marine eubacteria  
 <400> 17

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
 1 5 10 15

Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Ala Gly Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gly Ile Met Asn Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ser Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Ala Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
 225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 18  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 18

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
 1 5 10 15

Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Ala Gly Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gly Ile Met Asn Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
 165 170 175



Cys Asn Thr Ala Ser Pro Ser Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Ala Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
 225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 19  
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 <212> DNA  
 <213> Marine eubacteria

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 aaaacatcat taactgtatc tggcttggtt actggtattg ctttctggca ttacatgtac 240  
 atgagagggg tatggattga aactggtgat tcgccaactg tatttagata cattgattgg 300  
 ttactaacag ttcctctatt aatatgtgaa ttctacttaa ttcttgctgc tgctactaat 360  
 gttgctgctg gcctgtttaa gaaattattg gttggttctc ttgttatgct tgtgtttggt 420  
 tacatgggtg aagcaggaat tatgaacgct tggggtgcat tcgttattgg gtgttttagct 480  
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 atttatcctg taggttattt cacaggttac ctaatgggtg acggtggatc agcacttaac 660  
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 tggaatggtg ctgttaaaga atcttctaata gct 753

<210> 20  
 <211> 753  
 <212> DNA  
 <213> Marine eubacteria

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gctttattag catctactgt atttttcttt gttgaaagag atagagtttc tgcaaaatgg 180  
 aaaacatcat taactgtatc tgggtcttgtt actggtattg ctttctggca ttacatgtac 240  
 atgagagggg tatggattga aactggtgat tcgccaactg tatttagata cattgattgg 300  
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 gttgctgctg gcctgtttta gaaattattg gttggttctc ttgttatgct tgtgtttggt 420  
 tacatgggtg aagcaggaat tatgaacgct tggggtgcat tcgttattgg gtgttttagct 480  
 tgggtataca tgatttatga gctttggcct ggagaaggaa aagctgcgtg taatacagca 540  
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 tggaatgttg ctgttaaaga atcttctaata gct 753

<210> 21  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 21

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
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Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Ala Gly Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu

130

135

140

Ala Gly Ile Met Asn Ala Trp Gly Ala Phe Val Ile Gly Cys Leu Ala  
145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ala Ala  
165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
180 185 190

Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

&lt;210&gt; 22

&lt;211&gt; 753

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 22

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ttactaacag ttctcttatt aatatgtgaa ttctacttaa ttcttgctgc tgcaactaat 360  
gttgctgctg gcctgtttta gaaattattg gttggttctc ttgttatgct tgtgtttggt 420  
tacatgggtg aggcaggaat tatgaacgct tgggggtgcat tcgttattgg gtgttttagct 480  
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agtcctgctg tgcaatcagc ttacaacaca atgatgtata taatcatctt tgggtgggca 600  
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tggaatgttg ctgttaaaga atcttctaata gct 753

<210> 23  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 23

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
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Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gln Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ser Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Ala Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Leu Gly Leu Ile Ile  
 225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 24  
 <211> 753  
 <212> DNA  
 <213> Marine eubacteria

<400> 24  
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 gctctattag catctactgt atttttcttt gttgaaagag atagagtttc tgcaaaatgg 180  
 aaaacatcat taactgtatc tggctctggt actggtattg ctttctggca ttacatgtac 240  
 atgagagggg tatggattga aactggtgat tcgccaactg tatttagata cattgattgg 300  
 ttactaacag ttctctatt aatatgtgaa ttctacttaa ttcttgctgc tgctactaat 360  
 gttgctggat cattatttaa gaaattacta gttggttctc ttgttatgct tgtgtttggt 420  
 tacatgggtg aagcacaaat tatggctgca tggcctgcat tcattattgg gtgttttagct 480  
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 atttatcctg taggttattt cacaggttac ctaatgggtg acggtgggtc agctcttaac 660  
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 tggaatgttg ctgttaaaga atcttctaata gct 753

<210> 25  
 <211> 249  
 <212> PRT  
 <213> Marine eubacteria

<400> 25

Thr Met Gly Lys Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
 1 5 10 15

Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Ala Ala Asn Val Ala Gly Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
130 135 140

Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala  
165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
180 185 190

Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser  
245

<210> 26

<211> 748

<212> DNA

<213> Marine eubacteria

<400> 26

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gctttattag catctactgt atttttcttt gttgaaagag atagagtttc tgcaaaatgg 180

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 gttgctggat cattatttaa gaaattacta gttggttctc ttgttatgct tgtgtttggt 420  
 tacatgggtg aagcaggaat catggctgca tggcctgcat tcattattgg gtgttttagct 480  
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 atttatcctg taggttattt cacaggttac ttgatgggtg acggtggatc agctcttaac 660  
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<210> 27  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 27

Thr Met Gly Lys Leu Leu Leu Ile Ile Gly Ser Val Ile Ala Leu Pro  
 1 5 10 15

Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Tyr Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
 225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 28  
 <211> 753  
 <212> DNA  
 <213> Marine eubacteria

<400> 28  
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 tggaatgttg ctgttaaaga atcttctaata gct 753

<210> 29  
 <211> 249



&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 29

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
 1 5 10 15

Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Ala Gly Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gly Ile Met Asn Ala Trp Gly Ala Phe Val Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ala Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Asn Leu Phe Gly Leu Ile Ile  
 225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser  
245

<210> 30  
<211> 748  
<212> DNA  
<213> Marine eubacteria

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tggaatgttg ctgttaaaga atcttcta 748

<210> 31  
<211> 251  
<212> PRT  
<213> Marine eubacteria

<400> 31  
Thr Met Gly Lys Leu Leu Arg Ile Leu Gly Ser Val Ile Ala Leu Pro  
1 5 10 15  
Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
20 25 30  
Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
35 40 45  
Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
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65

70

75

80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
130 135 140

Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala  
165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
180 185 190

Tyr Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

&lt;210&gt; 32

&lt;211&gt; 753

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 32

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gctctattag catctactgt atttttcttt gttgaaagag atagagtttc tgcaaatgg 180

aaaacatcat taactgtatc tggcttgggt actggtattg ctttctggca ttacatgtat 240

atgagaggag tatggattga aactggtgat tcgccaactg tatttagata cattgattgg 300

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 tacatgggtg aagcaggaat catggctgca tggcctgcat tcattattgg gtgtttagct 480  
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<210> 33  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria  
 <400> 33

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
 1 5 10 15  
 Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
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 Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45  
 Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60  
 Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80  
 Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95  
 Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110  
 Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
 115 120 125  
 Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140  
 Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
                   165                  170                  175

Cys Asn Thr Ala Ser Pro Ser Val Gln Ser Ala Tyr Asn Thr Met Met  
                   180                  185                  190

Ala Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
                   195                  200                  205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
           210                  215                  220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
   225                  230                  235                  240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
                   245                  250

<210> 34  
 <211> 753  
 <212> DNA  
 <213> Marine eubacteria

<400> 34  
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 tggaatgttg ctgttaaaga atcttcta at 753

<210> 35  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

&lt;400&gt; 35

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 1 5 10 15

Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ser Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Ala Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
 225 230 235 240

Trp Asn Ala Ala Val Lys Glu Ser Ser Asn Ala  
 Page 30

245

<210> 36  
<211> 753  
<212> DNA  
<213> Marine eubacteria

<400> 36  
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ttactaacag ttcctctatt aatatgtgaa ttctacttaa ttcttgctgc tgctactaat 360  
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tggaatgctg ctgttaaaga atcttcta at gct 753

<210> 37  
<211> 251  
<212> PRT  
<213> Marine eubacteria

<400> 37

Thr Met Gly Lys Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
1 5 10 15

Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
130 135 140

Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala  
165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
180 185 190

Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 38  
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<212> DNA  
<213> Marine eubacteria

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gctttattag catctactgt atttttcttt gttgaaagag atagagtttc tgcaaaatgg 180  
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gttgctggat cattatttaa gaaattactt gttggttctc ttgttatgct tgtgtttggt 420  
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 tggaatgttg ctgttaaaga atcttctaata gct 753

<210> 39  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 39

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
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Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Val Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
180 185 190

Tyr Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 40  
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<212> DNA  
<213> Marine eubacteria

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gctctattag cgtctactgt atttttcttt gttgaaagag atagagtttc tgcaaaatgg 180  
aaaacatcat taactgtatc tgggtcttgtt actgggtattg ctttctggca ttacatgtat 240  
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ttactaacag ttcctttatt aatatgtgaa ttctacttaa ttcttgctgc tgcaactaat 360  
gttgccggct cattatttaa gaaacttcta gttggttctc ttgttatgct tgtgtttggt 420  
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atttatcctg taggttattt cacaggttac ctaatgggtg acggtggatc agctcttaat 660  
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tggaatgttg ctgttaaaga atcttctaata gct 753

<210> 41  
<211> 252  
<212> PRT  
<213> Marine eubacteria

<400> 41

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
Page 34

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1              5              10              15
Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly
      20      25      30
Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe
      35      40      45
Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu
      50      55      60
Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr
      65      70      75      80
Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg
      85      90      95
Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr
      100      105      110
Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys
      115      120      125
Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu
      130      135      140
Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Leu Gly Met Ala Gly
      145      150      155      160
Trp Leu Tyr Met Ile Tyr Glu Leu His Met Gly Glu Gly Lys Ala Ala
      165      170      175
Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met
      180      185      190
Lys Ile Ile Val Ile Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala
      195      200      205
Gly Tyr Leu Met Ser Gly Asp Gly Val Tyr Ala Ser Asn Leu Asn Leu
      210      215      220
Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile
      225      230      235      240
Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala
      245      250

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 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

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 atttggaatg ttgctgttaa agaattctct aatgct 756

<210> 43  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 43  
 Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
 1 5 10 15  
 Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
 20 25 30  
 Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
 35 40 45  
 Phe Phe Val Glu Arg Asp Gln Val Ser Ala Glu Trp Lys Thr Ser Leu  
 50 55 60  
 Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
 65 70 75 80  
 Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 44  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

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 atttggaatg ttgctgttaa agaattctct aatgct 756

<210> 45  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 45

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20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
50 55 60

Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Cys Thr Asn Val Ala Ala Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
130 135 140

Ala Gly Leu Ala Pro Val Trp Pro Ala Phe Ile Ile Gly Met Ala Gly  
145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met

180

185

190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 46  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

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<210> 47  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 47

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Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
50 55 60

Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Ser Ala Gly Glu  
130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
210 215 220

Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 48  
<211> 756  
<212> DNA



&lt;213&gt; Marine eubacteria

&lt;400&gt; 48

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&lt;210&gt; 49

&lt;211&gt; 252

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 49

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Thr Met Gly Lys Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro
1          5          10         15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly
          20         25         30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe
          35         40         45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu
          50         55         60

Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr
65          70          75         80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg
          85         90         95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr
          100        105        110

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Leu Ile Leu Ala Ala Cys Thr Asn Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Trp Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Val Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 50  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

<400> 50  
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 ggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
 aaaacttcac ttactgtatc tggtttaatt actggtatag ctttttggca ttatctctat 240  
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 gttgctgctt cattatttaa gaagcttcta gctggttcat tagtaatgtt aggtgctgga 420  
 tttgcaggcg aagctggatt agctcctgta tggcctgctt tcattattgg tatggctgga 480  
 tggttataca tgatttatga gctatatatg ggtgaaggta aggctgctgt aagtactgca 540  
 agtcctgctg ttaactctgc atacaacgca atgatggtga ttattgttgt tggatgggca 600

atttatacctg ctggatatgc tgctgggttac ctaatgggtg gcgaagggtg atacgcttca 660  
aacctaaacc ttatatataa ccttgctgac tttgttaaca agattctatt tggtttgatc 720  
atttggaatg ttgctgttaa agaattctct aatgct 756

<210> 51  
<211> 252  
<212> PRT  
<213> Marine eubacteria

<400> 51

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
1 5 10 15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
50 55 60

Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 52  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

<400> 52  
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 aaaacttcac ttactgtatc tggtttaatt actggtatag ctttttggca ttatctctat 240  
 atgagaggtg tttggataga cactggtgat accccaacag tattcagata tattgattgg 300  
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 tttgcaggcg aagctggatt agctcctgta ttacctgctt tcattattgg tatggctgga 480  
 tggttataca tgatttatga gctatatatg ggtgaaggta aggctgctgt aagtactgca 540  
 agtcctgctg ttaactctgc atacaacgca atgatgatga ttattgttgt tggatgggca 600  
 atttatcctg ctggatatgc tgctggttac ctaatgggtg gcgaagggtg atacgcttca 660  
 aacttaaacc ttatatataa ccttgctgac cttgttaaca agattctatt tggtttgatc 720  
 atttggaatg ttgctgttaa agaattctct aatgct 756

<210> 53  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 53

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
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Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
           35                          40                          45  
 Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
   50                          55                          60  
 Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
   65                          70                          75                          80  
 Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
                           85                          90                          95  
 Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Val Val Glu Phe Tyr  
                          100                         105                         110  
 Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
          115                         120                         125  
 Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
   130                         135                         140  
 Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
  145                         150                         155                         160  
 Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
                          165                         170                         175  
 Val Ser Thr Ala Ser Pro Ala Val Asn Pro Ala Tyr Asn Ala Met Met  
          180                         185                         190  
 Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
   195                         200                         205  
 Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
   210                         215                         220  
 Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
  225                         230                         235                         240  
 Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
                          245                         250

<210> 54  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria  
 <400> 54

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ggatatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg   180
aaaacttcac ttactgtatc tggtttaatt actggtatag ctttttggca ttatctctat   240
atgagaggtg tttggataga cactggtgat accccaacag tattcagata tattgattgg   300
ttattaactg ttccattaca agtggttgag ttctatctaa ttcttgctgc ttgtacaagt   360
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tggttataca tgatttatga gctatatatg ggtgaaggca aggctgctgt aagtactgca   540
agtcctgctg ttaaccctgc atacaacgca atgatgatga ttattgttgt tggatgggca   600
atztatcctg ctggatatgc tgctggttac ctaatgggtg gcgaaggtgt atacgcttca   660
aacttaaacc ttatatataa ctttgctgac tttgttaaca agattctatt tggtttgatc   720
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<210> 55
<211> 252
<212> PRT
<213> Marine eubacteria

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<400> 55
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Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro
1          5          10          15

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Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly
          20          25          30

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Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe
          35          40          45

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Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu
          50          55          60

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Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr
65          70          75          80

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Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg
          85          90          95

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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr
          100          105          110

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Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys

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115

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu His Met Gly Glu Gly Lys Ala Ala  
165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
180 185 190

Lys Ile Ile Val Ile Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
195 200 205

Gly Tyr Leu Met Ser Gly Asp Gly Val Tyr Ala Ser Asn Leu Asn Leu  
210 215 220

Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 56  
<211> 756  
<212> DNA  
<213> Marine eubacteria

<400> 56  
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ggatatgttag cggcaactgt attctttttt gtagaaagag accaagtcag cgctaagtgg 180  
aaaacttcac ttactgtatc tggtttaatt actggtatag ctttttggca ttatctctac 240  
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ttattaactg ttccattaca aatgggttgag ttctatctaa ttcttgctgc ttgtacaagt 360  
gttgctgctt cattatttaa gaagcttcta gctggttcat tagtaatgtt aggtgctgga 420  
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atttatcctg ctggatatgc tgctggttac ctaatgagtg gtgacggtgt atacgcttca 660

aacttaaacc ttatatataa ccttgctgac ttgttaaca agattctatt tggtttgatc 720  
 atttggaatg ttgctgttaa agaattctct aatgct 756

<210> 57  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria  
 <400> 57

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
 1 5 10 15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205



Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 58  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

<400> 58  
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 ggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
 aaaacttcac ttactgtatc tggtttaatt actggtatag ctttttggca ttatctctat 240  
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 ttattaactg ttccattaca aatggttgag ttctatctaa ttcttgctgc ttgtacaagt 360  
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 agtcctgctg ttaactctgc atacaacgca atgatgatga ttattgttgt tggatgggca 600  
 atttatcctg ctggatatgc tgctggttac ctaatgggtg gcgaaggcgt atacgcttca 660  
 aacttaaacc ttatatataa ccttgctgac tttgttaaca agattctatt tggtttgatc 720  
 atttggaatg ttgctgttaa agaattctct aatgct 756

<210> 59  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 59

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Lys Ser Ser Asn Ala  
245 250

<210> 60

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 60

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 agagggtgat ggatagaaac tggtgattcg cctactgtct ttagatacat cgactgggta 300  
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 aaccttattt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaaaaatc ttctaattgct a 751

<210> 61  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 61

Met Gly Lys Leu Leu Leu Ile Leu Gly Asn Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 62  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 62  
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 aatgttgctg ttaaagaatc ttctaagtct a 751

<210> 63  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 63

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Ser Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Ala Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 64  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 64  
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 ctattagcat ctactgtatt cttctttggt gaaagggata gagtatctgc aaaatggaaa 180  
 acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240  
 agaggtgtat ggatagaaac tggtagtcca cctactgtct ttagatacat tgactggcta 300  
 ttaacagtgc ctttactaat atgtgagttc tattaatac ttgccgcagc tactaatgtt 360  
 gctggttcat tattaagaa attgctagtt ggttctcttg tgatgcttgt gtttggttac 420  
 atgggtgaag caggaataat ggcagcttg cctgcattca tcattggatg tttagcatgg 480  
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 aaccttattt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 65  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 65

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
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50

55

60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 66

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 66

atgggtaaat tattactgat attaggtagt gttatcgcg c ttccaacatt tgctgctggc 60

ggtggcgatc ttgatgctag tgactacact ggtgtttcat tctggttagt tactgctgct 120

ctattagcgt ctactgtatt cttctttgtt gaaagagata gagtgtctgc aaaatggaaa 180

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acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240  
agaggtgtat ggatagaaac tggtagattcg cctactgtct ttagatacat cgactggtta 300  
ttaactgtgc ctttactaat atgtgagttc tatctgatac ttgctgcagc tactaatgtt 360  
gctggttcat tatttaagaa attgctagtt ggttctcttg tgatgcttgt gtttggttac 420  
atgggtgaag caggaataat ggcagcttgg cctgcattca tcattggatg tttagcatgg 480  
gtatatatga tttatgaact atgggctggg gaaggaaaat ctgcatgcaa tactgcaagt 540  
cctgctgtac agtcagctta caacacaatg atgtatatca tcatcgttgg ttgggcaatt 600  
tatcctgtag gttatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta 660  
aaccttattt ataaccttgc tgactttgtt aacaagattc tatttggttt aattatatgg 720  
aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 67  
<211> 250  
<212> PRT  
<213> Marine eubacteria

<400> 67

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Ser Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140



Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Ala Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Asn Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 68  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 68  
 atgggtaaat tattactgat attaggtagt gttatcgcgc ttccaacatt tgctgctggc 60  
 ggtggcgatc ttgatgctag tgactacact ggtgtttcat tctggttagt tactgctgct 120  
 ctattagcgt ctactgtatt cttctttggt gaaagagata gagtgtctgc aaaatggaaa 180  
 acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240  
 agaggtgtat ggatagaaac tggtagttca cctactgtct ttagatacat tgactggcta 300  
 ttaacagtgc ctttactaat atgtgagttc tatttaatac ttgccgcagc tactaatggt 360  
 gctggttcat tatttaagaa attgctagtt ggttctcttg ttatgcttgt gttcggttac 420  
 atgggtgaag caggaataat ggcagcttgg cctgcattca tcattgggtg tttagcatgg 480  
 gtatatatga tttatgagct atgggctggt gaaggaaaat ctgcatgtaa tactgcaagt 540  
 cctgctgtac agtcagctta caacacaatg atgtatatca tcatcgctgg ttgggcaatt 600  
 tatcctgtag gttatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta 660  
 aaccttaatt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 69

&lt;211&gt; 250

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 69

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 Page 58

225

230

235

240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 70  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 70  
 atgggtaaatt tattactgat attaggtagt gttatcgcg c ttccaacatt tgctgctggc 60  
 ggtggcgatc ttgatgctag tgactatact ggtgtttcat tctggttagt tactgctgct 120  
 ctattagcgt ctactgtatt cttctttggt gaaagagata gagtgtctgc aaaatggaaa 180  
 acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240  
 agaggtgtat ggatagaaac tgggtattcg cctactgtct ttagatacat agactgggta 300  
 ttaactgtgc ctttactaat atgtgagttc tatctgatac ttgctgcagc tactaatgtt 360  
 gctggttcat tatttaagaa attgctagtt ggttctcttg tgatgcttgt gtttggttac 420  
 atgggtgaag caggaataat ggcagcttgg cctgcattca tcattggatg tttagcatgg 480  
 gtatatatga tttatgaact atgggctggt gaaggaaaat ctgcatgcaa tactgcaagt 540  
 cctgctgtac aatcagctta caacacaatg atgtatatca tcatcgttgg ttgggcaatt 600  
 tatcctgtag gttatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta 660  
 aaccttattt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 71  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 71

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Ser Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 72

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 72

atgggtaaat tattactgat attaggtagt gttattgcgc ttccaacatt tgccgctggc 60

ggtggcgatc ttgatgctag tgactacact ggtgtttctt tctggttagt tactgctgct 120

ctattagcat ctactgtatt cttctttggt gaaagggata gagtatctgc aaaatggaaa 180

acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240

agaggtgtat ggatagaaac tggtagttca cctactgtct ttagatacat tgactggcta 300

ttaacagtgc ctttactaat atgtgagttc tattaataac ttgccgcagc tactaatgtt 360  
 gctggttcat tattaagaa attgctagtt ggttctcttg ttatgcttgt gttcggttac 420  
 atgggtgaag caggaataat ggcagcttgg cctgcattca tcattggatg tttagcatgg 480  
 gtatatatga tttatgaact atgggctggt gaaggaaaat ctgcatgcaa tactgcaagt 540  
 cctgctgtac agtcagctta caacacaatg atgtatatca tcatcgttgg ttgggcaatt 600  
 tatcctgtag gttatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta 660  
 aaccttattt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaagtct a 751

<210> 73  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 73

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
                           165                          170                          175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
                           180                          185                          190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Leu Val Gly Tyr Phe Thr Gly  
                           195                          200                          205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
                           210                          215                          220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
                           225                          230                          235                          240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
                           245                          250

<210> 74  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 74  
 atgggtaaat tattactgat attaggtagt gttattgcmc ttccaacatt tgccgctggt 60  
 ggtggtgacc tggatgctag tgactacact ggtgtatctt tctggttagt tactgctgct 120  
 ctattagcat ctactgtatt tttctttggt gaaagagaca gagtttctgc taaatggaaa 180  
 acatcattaa cagtatctgg tttagttact ggtattgctt tttggcatta catgtacatg 240  
 agaggtgtat ggattgaaac tgggtgattca ccaactgttt ttagatacat cgactggttg 300  
 ctaactgtgc ctttactaat ttgtgagttc tacttaatac tagcagcagc tactaacgtt 360  
 gctggttctt tattcaagaa attactagtt ggttctcttg ttatgcttgt gtttggttac 420  
 atgggtgaag caggaattat ggcagcctgg cctgcattca ttataggatg tttagcatgg 480  
 gtatacatga tttatgaatt atgggctgga gaaggaaagt ctgcatgtaa cactgcaagt 540  
 cctgcagttc agtcagctta caacacaatg atgtatatca tcattcttgg ttgggctatt 600  
 tacctttagt gttattttcac tggttacctt atgggtgacg gtggatcagc tcttaactta 660  
 aaccttatct ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaagtct a 751

<210> 75  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

&lt;400&gt; 75

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Ser Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Ala Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 76  
<211> 751  
<212> DNA  
<213> Marine eubacteria

<400> 76  
atgggtaaat tattactgat attaggtagt gttattgctc ttccaacatt tgccgctggc 60  
ggtggcgatc ttgatgctag tgactacact ggtgtttctt tctggttagt tactgctgct 120  
ctattagcat ctactgtatt cttctttggt gaaagggata gagtatctgc aaaatggaaa 180  
acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240  
agaggtgtat ggatagaaac tggtagttca cctactgtct ttagatacat tgactggcta 300  
ttaacagtgc ctttactaat atgtgagttc tattaatac ttgccgcagc tactaatggt 360  
gctggttcat tattaagaa attgctagtt ggttctcttg ttatgcttgt gttcggttac 420  
atgggtgaag caggaataat ggcagcttgg cctgcattca tcattgggtg tttagcatgg 480  
gtatatatga tttatgagct atgggctggt gaaggaaaat ctgcatgtaa tactgcaagt 540  
cctgctgtac agtcagctta caacacaatg atgtatatca tcatcgctgg ttgggcaatt 600  
tattcctgtag gttatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta 660  
aaccttattt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
aatgttgctg ttaaagaatc ttctaattgt a 751

<210> 77  
<211> 250  
<212> PRT  
<213> Marine eubacteria

<400> 77

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80



Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 78

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 78

atgggtaaat tattactgat attaggtagt gttatcgcgc ttccaacatt tgctgctggc 60

ggtggcgatc ttgatgctag tgactacact ggtgtttcat tctggttagt tactgctgct 120

ctattagcgt ctactgtatt cttctttggt gaaagagata gagtgtctgc aaaatggaaa 180

acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240

agaggtgtat g gatagaaac tgggtattcg cctactgtct ttagatacat cgactggtta 300

ttaactgtgc ctttactaat atgtgagttc tatctgatac ttgctgcagc tactaatgtt 360

gctggttcat tattaagaa attgctagtt ggttctcttg tgatgcttgt gtttggttac 420  
 atgggtgaag caggaataat ggcagcttgg cctgcattca tcattggatg tttagcatgg 480  
 gtatatatga tttatgaact atgggctggt gaaggaaaat ctgcatgcaa tactgcaagt 540  
 cctgctgtac agtcagctta caacacaatg atgtatatca tcatcgttgg ttgggcaatt 600  
 tatcctgtag gttatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta 660  
 aaccttattt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatggtgctg ttaaagaatc ttctaattgct a 751

<210> 79  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 79

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Ala  
 50 55 60

Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Cys Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys

165

170

175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 80  
 <211> 750  
 <212> DNA  
 <213> Marine eubacteria

<400> 80  
 atgggtaaat tattactgat attaggtagt gttattgcac ttctacatt tgctgcaggt 60  
 ggtggtgacc ttgatgctag tgattacact ggtgtttctt tttggttagt tactgctgct 120  
 ttattagcat ctactgtatt tttctttggt gaaagagata gagtttctgc aaaatggaaa 180  
 acatcattag ctgtatctgg tcttattact ggtattgcgt tctggcattg catgtacatg 240  
 agaggggtat ggattgaaac tggtgattcg ccaactgtat ttagatacat tgattggtta 300  
 ctaacagttc ctctattaat atgtgaattc tacttaattc ttgctgctgc aactaatggt 360  
 gctggatcat tattaagaa attactagtt ggttctcttg ttatgcttgt gtttggttac 420  
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 gtatacatga tttatgaatt atgggctgga gaaggaaaat ctgcatgtaa tactgcaagt 540  
 cctgctgtgc aatcagctta caacacaatg atgtatatta tcgtctttgg ttgggcgatt 600  
 tctcctgtag gttatttcac aggttacctg atgggtgacg gtggatcagc tcttaactta 660  
 aaccttatct ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct 750

<210> 81  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 81

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Ser  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 82  
 <211> 750  
 <212> DNA  
 <213> Marine eubacteria

<400> 82  
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 ggtggtgacc ttgatgctag tgattacact ggtgtttctt tttggttagt tactgctgct 120  
 ttattagcat ctactgtatt ttcctttggt gaaagagata gagtttctgc aaaatggaaa 180  
 acatcattaa ctgtatctgg tcttattact ggtattgctt tctggcatta catgtacatg 240  
 agaggggtat ggattgaaac tggtgattcg ccaactgtat ttagatacat tgattggtta 300  
 ctaacagttc ctctattaat atgtgaattc tacttaattc ttgctgctgc aactaatgtt 360  
 gctggatcat tattaagaa attactagtt ggttctcttg ttatgcttgt gtttggttac 420  
 atgggtgaag caggaatcat ggctgcatgg cctgcattca ttattgggtg tttagcttgg 480  
 gtatacatga tttatgaatt atgggctgga gaaggaaaat ctgcatgtaa tactgcaagt 540  
 cctgctgtgc aatcagctta caacacaatg atgtatatta tcattcttgg ttgggcgatt 600  
 tatcctgtag gttatttcac aggttacctg atgggtgacg gtggatcagc tcttaactta 660  
 aaccttatct ataacctgac tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct 750

<210> 83  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 83

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110  
 Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125  
 Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140  
 Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160  
 Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175  
 Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190  
 Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205  
 Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220  
 Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Ser Ile Ile Trp  
 225 230 235 240  
 Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 84  
 <211> 750  
 <212> DNA  
 <213> Marine eubacteria

<400> 84  
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 ggtggtgacc ttgatgctag tgattacact ggtgtttctt tttggttagt tactgctgct 120  
 ttattagcat ctactgtatt tttctttggt gaaagagata gagtttctgc aaaatggaaa 180  
 acatcattaa ctgtatctgg tcttattact ggtattgctt tctggcatta catgtacatg 240  
 agaggggtat ggattgaaac tggtgattcg ccaaccgtat ttagatacat tgattggtta 300  
 ctaacagttc ctctattaat atgtgaattc tacttaattc ttgctgctgc aactaatgtt 360  
 gctggatcat tattaagaa attactagtt ggttctcttg ttatgcttgt gtttggttac 420  
 atgggtgaag caggaatcat ggctgcatgg cctgcattca ttattgggtg tttagcttgg 480

gtatacatga tttatgaatt atgggctgga gaaggaaaat ctgcatgtaa tactgcaagt 540  
 cctgctgtgc aatcagctta caacacaatg atgtatatta tcattcttgg ttgggcgatt 600  
 tatcctgtag gttatttcac aggttacctg atgggtgacg gtggatcagc acttaactta 660  
 aaccttatct ataaccttgc tgactttgtt aacaagattc tatttggttc aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaagtct 750

<210> 85  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 85

Met Gly Lys Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 86  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 86  
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 ggtggtgacc ttgatgctag tgattacact ggtgtttctt tttggttagt tactgctgct 120  
 ttattagcgt ctactgtatt cttctttggt gaaagagata gagtgtctgc aaaatggaaa 180  
 acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240  
 agaggtgtat ggatagaaac tgggtgattcg cctactgtct ttagatacat cgactgggta 300  
 ttaactgtgc ctttactaat atgtgagttc tatctgatac ttgctgcagc tactaatggt 360  
 gctggttcat tattaagaa attgctagtt ggttctcttg tgatgcttgt gtttggttac 420  
 atgggtgaag caggaataat ggcagcttgg cctgcattca tcattgggtg ttttagcatgg 480  
 gtatatatga tttatgaact atgggctggt gaaggaaaat ctgcatgcaa tactgcaagt 540  
 cctgctgtac agtcagctta caacacaatg atgtatatca tcatcgttgg ttgggcaata 600  
 tatcctgtag gttatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta 660  
 aaccttatct ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 87  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 87

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15



Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
                   20                                  25                                  30  
 Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
                   35                                  40                                  45  
 Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
                   50                                  55                                  60  
 Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
                   65                                  70                                  75                                  80  
 Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
                                   85                                  90                                  95  
 Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
                                   100                                  105                                  110  
 Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
                                   115                                  120                                  125  
 Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
                   130                                  135                                  140  
 Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
                   145                                  150                                  155                                  160  
 Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
                                   165                                  170                                  175  
 Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
                                   180                                  185                                  190  
 Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
                                   195                                  200                                  205  
 Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
                   210                                  215                                  220  
 Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
                   225                                  230                                  235                                  240  
 Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
                                   245                                  250

<210> 88  
 <211> 751

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 88

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ctattagcgt ctactgtatt cttctttggt gaaagagata gagtgtctgc aaaatggaaa      180
acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg      240
agaggtgtat ggatagaaac tggtgattcg cctactgtct ttagatacat cgactgggta      300
ttaactgtgc ctttactaat atgtgagttc tatctgatac ttgctgcagc tactaatggt      360
gctggttcat tattaagaa attgctagtt ggttctcttg tgatgcttgt gtttggttac      420
atgggtgaag caggaataat ggcagcttgg cctgcattca tcattggatg tttagcatgg      480
gtatatatga tttatgaact atgggctggt gaaggaaaat ctgcatgcaa tactgcaagt      540
cctgctgtac agtcagctta caacacaatg atgtatatca tcatcgttgg ttgggcaatt      600
tattctgtag gctatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta      660
aaccttattt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg      720
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&lt;210&gt; 89

&lt;211&gt; 250

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 89

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Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr
1           5           10           15

```

```

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val
20           25           30

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Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe
35           40           45

```

```

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr
50           55           60

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```

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met
65           70           75           80

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```

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr
85           90           95

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Ile Asp Trp Leu Leu Pro Val Pro Leu Ala Ile Cys Glu Phe Tyr Leu

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100

105

110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 90  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 90  
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 ggtggtgacc ttgatgctag tgattacact ggtgtttctt tttggttagt tactgctgct 120  
 ttattagcat ctactgtatt tttctttggt gaaagagata gagtttctgc aaaatggaaa 180  
 acatcattaa ctgtatctgg tcttggtact ggtattgctt tctggcatta catgtacatg 240  
 agaggggtat ggattgaaac tgggtattcg ccaactgtat ttagatacat tgattggtta 300  
 ctaccagttc ctctagcaat atgtgaattc tacttaattc ttgctgctgc aactaatgtt 360  
 gctggatcat tattaagaa attactagtt ggttctcttg ttatgcttgt gtttggttac 420  
 atgggtgaag caggaatcat ggctgcatgg cctgcattca ttattgggtg tttagcttgg 480  
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cctgctgtgc aatcagctta caacacaatg atgtatatta tcattcttgg ttgggcgatt 600  
 tatcctgtag gttatttcac aggttacctg atgggtgacg gtggatcagc tcttaactta 660  
 aaccttatct ataaccttgc tgactttgtt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 91  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 91

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Leu Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 92  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

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 ctattagcat ctactgtatt tttctttggt gaaagagaca gagtttctgc taaatggaaa 180  
 acatcattaa cagtatctgg tttagttact ggtattgctt tttggcatta catgtacatg 240  
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 ctaactgtgc ctttactaat ttgtgagttc tacttaatac tagcagcagc tactaacggt 360  
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 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 93  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 93

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45  
 Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60  
 Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80  
 Arg Gly Val Trp Ile Glu Thr Gly Ser Ser Pro Thr Val Phe Arg Tyr  
 85 90 95  
 Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110  
 Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125  
 Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140  
 Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160  
 Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175  
 Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190  
 Ile Ile Ile Phe Gly Trp Ala Ile Tyr Leu Val Gly Tyr Phe Thr Gly  
 195 200 205  
 Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220  
 Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240  
 Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 94  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

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 aaccttatct ataacctgct tgactttgtt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 95  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 95

Met Gly Lys Leu Leu Leu Arg Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 96  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

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 ctattagcgt ctactgtatt cttctttggt gaaagagata gagtgtctgc aaaatggaaa 180  
 acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240  
 agagggtgat ggatagaaac tggtgattcg cctactgtct ttagatacat cgactggtta 300  
 ttaactgtgc ctttactaat atgtgagttc tatctgatac ttgctgcagc tactaatgtt 360  
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aatgttgctg ttaaagaatc ttctaagtct a 751

<210> 97  
<211> 250  
<212> PRT  
<213> Marine eubacteria  
<400> 97

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
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Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Ala  
50 55 60

Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 98  
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 <212> DNA  
 <213> Marine eubacteria

<400> 98  
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<210> 99  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 99

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
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Phe Ala Ala Gly Gly Gly Asp Pro Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 Page 82

35

Phe Val Glu Arg Asp Arg Val Ser Ala Glu Trp Lys Thr Ser Leu Thr  
50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Glu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Ile Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 100

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 100

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<210> 101
<211> 250
<212> PRT
<213> Marine eubacteria

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<400> 101

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Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr
1          5          10          15

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```

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val
          20          25          30

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Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe
          35          40          45

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Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr
50          55          60

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Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met
65          70          75          80

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Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr
          85          90          95

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Ile Asp Trp Leu Leu Thr Val Pro Leu Val Ile Cys Glu Phe Tyr Leu
100          105          110

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Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu
115          120          125

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Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 102  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

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aatgttgctg ttaaagaatc ttctaagtct a

751

<210> 103  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 103

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Pro Gly Leu Ile Thr Asp Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 Page 86

210

215

220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 104  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

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<210> 105  
 <211> 249  
 <212> PRT  
 <213> Marine eubacteria

<400> 105

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
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Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60

Val Pro Gly Leu Ile Thr Asp Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn  
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<210> 106

<211> 748

<212> DNA

<213> Marine eubacteria

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<210> 107  
<211> 250  
<212> PRT  
<213> Marine eubacteria

<400> 107

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Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
35 40 45  
Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60  
Val Pro Gly Leu Ile Thr Asp Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80  
Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95  
Ile Asp Trp Leu Leu Thr Val Ser Leu Gln Ile Cys Glu Phe Tyr Leu  
100 105 110  
Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125  
Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 108  
<211> 751  
<212> DNA  
<213> Marine eubacteria

<400> 108  
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aatgttgctg ttaaagaatc ttctaattgct a 751

&lt;210&gt; 109

&lt;211&gt; 250

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 109

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Pro Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Ala Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Glu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 110  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

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 aatgttgctg ttaaagaatc ttctaagtct a 751

<210> 111  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 111

Met Gly Lys Leu Leu Val Met Leu Gly Ser Val Ile Ala Leu Pro Thr  
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Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 112

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 112

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ctattagcat ctactgtatt tttctttggt gaaagagaca gagtttctgc taaatggaaa 180

acatcattaa cagtatctgg tttagttact ggtattgctt tttggcatta catgtacatg 240

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 gctgggttctt tattcaagaa attactagtt gggttctcttg ttatgcttgt gtttggttac 420  
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 cctgcagttc agtcagctta caacacaatg atgtatatca tcattctttgg ttgggctatt 600  
 taccctgtag gttatttcac tggttacctt atgggtgacg gtggatcagc tcttaactta 660  
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<210> 113  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 113

Met Gly Lys Arg Leu Val Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
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Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
Page 94

145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Leu Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210>	114
<211>	751
<212>	DNA
<213>	Marine eubacteria

<400>	114								
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ggtggtgacc	tggatgctag	tgactacact	ggtgtatctt	tctgggttagt	tactgctgct				120
ctattagcat	ctactgtatt	tttctttggt	gaaagagaca	gagtttctgc	taaattggaaa				180
acatcattaa	cagtatctgg	tttagttact	ggtattgctt	tttggcatta	catgtacatg				240
agaggtgtat	ggattgaaac	tggtgattca	ccaactgttt	ttagatacat	cgactgggtg				300
ctaactgtgc	ctttactaat	ttgtgagttc	tacttaatac	tagcagcagc	tactaacgtt				360
gctgggttctt	tattcaagaa	attactagtt	ggttctcttg	ttatgcttgt	gtttgggttac				420
atgggtgaag	caggaattat	ggcagcctgg	cctgcattca	ttataggatg	tttagcatgg				480
gtatacatga	tttatgaatt	atgggctgga	gaaggaaagt	ctgcatgtaa	cactgcaagt				540
cctgcagttc	agtcagctta	caacacaatg	atgtatatca	tcatctttgg	ttgggctatt				600
taccttgtag	gttattttcac	tggttaccta	atgggtgacg	gtggatcagc	tcttaactta				660
aaccttatct	ataaccttgc	tgactttggt	aacaagattc	tatttggttt	aattatatgg				720
aatgttgctg	ttaaagaatc	ttctaattgct	a						751

<210>	115
<211>	250
<212>	PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 115

Met Gly Lys Ala Leu Leu Met Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Pro Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Leu Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Arg  
 225 230 235 240



Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
                   245                  250

<210> 116  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 116  
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 ggtggtgacc tggatgctag tgactacact ggtgtatctt tctggttagt tactgctgct 120  
 ccattagcat ctactgtatt tttctttggt gaaagagaca gagtttctgc taaatggaaa 180  
 acatcattaa cagtatctgg tttagttact ggtattgctt tttggcatta catgtacatg 240  
 agaggtgtat ggattgaaac tggtgattca ccaactgttt ttagatacat cgactggttg 300  
 ctaactgtgc ctttactaat ttgtgagttc tacttaatac tagcagcagc tactaacggt 360  
 gctggttctt tattcaagaa attactagtt ggttctcttg ttatgcttgt gtttggttac 420  
 atgggtgaag caggaattat ggcagcctgg cctgcattca ttataggatg tttagcatgg 480  
 gtatacatga tttatgaatt atgggctgga gaaggaaagt ctgcatgtaa cactgcaagt 540  
 cctgcagttc agtcagctta caacacaatg atgtatatca tcatctttgg ttgggctatt 600  
 tacctttagt gttatttcac tggttaccta atgggtgacg gtggatcagc tcttaactta 660  
 aaccttatct ataaccttgc tgactttggt aacaagattc tatttggttt aattataagg 720  
 aatgttgctg ttaaagaatc ttctaattgt a 751

<210> 117  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 117  
 Met Gly Lys Gly Leu Leu Met Leu Gly Ser Val Ile Ala Leu Pro Ser  
 1                  5                  10                  15  
 Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
                   20                  25                  30  
 Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
                   35                  40                  45  
 Phe Val Glu Arg Asp Arg Val Ala Ala Lys Trp Lys Thr Ser Leu Thr  
                   50                  55                  60  
 Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65                  70                  75                  80

Arg Gly Val Trp Val Glu Thr Gly Glu Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Ile Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Phe Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Ile Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

His Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 118

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 118

atgggtaaag gattactgat gttaggtagt gttattgcgc ttccatcttt tgctgctggc 60

gggtggcgatc ttgatgctag tgactataca ggtgtttcat tctggttggt tactgctgca 120

ttattagcct caactgtttt cttctttggt gaaagagaca gagttgctgc aaaatggaaa 180

acatcgtaa cagtatctgg tcttggtact ggtattgctt tttggcatta catgtacatg 240

agaggggttt gggtagagac tggtgaatca ccaactgtat tcagatatat tgactggcta 300

ctaacagtac cattattaat atgtgagttc tacttaatac ttgcagctgc aactaatgtt 360

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gctggttctt tatttaaaaa gctattaatt ggttctcttg ttatgcttgt gtttggttac 420
atgggtgaag caggaatcat ggcagcttgg cctgcattca ttattgggtg cttagcttgg 480
ttctacatga tttatgaact atgggctggt gaaggaaagt ctgcttgtaa tactgcaagt 540
ccagctgttc aatcagcata caacacgatg atgtatatta ttatcattgg ttgggctatt 600
taccctgtag gttactttac tggttaccta atgggtgacg gcggatctgc cttaaaactta 660
aacctaattt ataaccttgc tgacttcggt aacaagattc tatttggttt aattatctgg 720
catgttgctg ttaaagaatc ttctaattgct a 751

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```

<210> 119
<211> 250
<212> PRT
<213> Marine eubacteria

```

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<400> 119
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Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Ser
1          5          10          15

```

```

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Gly Asp Tyr Thr Gly Val
          20          25          30

```

```

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe
          35          40          45

```

```

Phe Ile Glu Arg Asp Arg Val Ala Ala Lys Trp Lys Thr Ser Leu Thr
50          55          60

```

```

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met
65          70          75          80

```

```

Arg Gly Val Trp Val Glu Thr Gly Glu Ser Pro Thr Val Phe Arg Tyr
          85          90          95

```

```

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu
100          105          110

```

```

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu
115          120          125

```

```

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala
130          135          140

```

```

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Val Gly Cys Leu Ala Trp
145          150          155          160

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Phe Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Ile Gly Trp Ala Ile Tyr Pro Leu Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

His Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 120  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 120  
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 ggcggcgacc ttgatgctgg tgattacact ggtgtagtt tttggttagt gactgcagct 120  
 cttttggctt caactgtatt tttctttatt gaaagagata gagttgctgc taaatggaag 180  
 acatctttaa cagtatctgg tctagttact ggtattgctt tctggcatta catgtacatg 240  
 agaggtgttt gggtcgaaac tggatgaatca ccaactgtat tcagatatat tgactggcta 300  
 cttacagtgc ctttattaat atgtgagttt tatctgattc ttgcagctgc aactaatggt 360  
 gctggttcctt tatttaagaa gcttttagtt gggtctcttg taatgcttgt atttggttat 420  
 atgggcgaag caggaattat ggcagcttgg cctgcattca ttgttgatg tttagcttgg 480  
 ttctatatga tttatgagct atgggctgga gaaggaaaat ctgcatgcaa tactgcaagt 540  
 ccagctgttc aatcagcata caacacaatg atgtatatta ttatcattgg ttgggctatt 600  
 tatcctcttg ggtactttac tggttacctt atgggtgacg gcggatcagc cttaaactta 660  
 aacctaattt ataaccttgc tgactttggt aacaagattc tatttggttt aatcatatgg 720  
 catgtcgctg ttaaagaatc ttctaagtct a 751

<210> 121  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 121

Met Gly Lys Gln Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Ser  
 1 5 10 15  
 Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30  
 Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45  
 Phe Ile Glu Arg Asp Arg Val Ala Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60  
 Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80  
 Arg Gly Val Trp Val Glu Thr Gly Glu Ser Pro Thr Val Phe Arg Tyr  
 85 90 95  
 Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110  
 Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125  
 Leu Ile Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140  
 Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160  
 Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175  
 Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190  
 Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205  
 Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220  
 Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240  
 His Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250  
 Page 101

<210> 122  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 122  
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 ggtggcgatc ttgatgctag tgactataca ggtgtttcat tctggttagt tactgctgca 120  
 ttattagcct caactgtttt cttttttatt gaaagagaca gagttgctgc aaaatggaaa 180  
 acgtcgttaa cagtatctgg ccttggtact ggtattgctt tttggcacta cttgtatatg 240  
 agaggagttt gggtagagac tggtagaatca ccaactgtat tcagatatat tgactgggta 300  
 ctaacagtac cattattaat atgtgagttt tacttaatac ttgcagctgc aactaatggt 360  
 gctggttctt tatttaaaaa gctattaatt ggttctcttg tgatgcttgt gtttggttac 420  
 atgggtgaag caggaatcat ggcggcttgg cctgcattca ttattgggtg cttagcttgg 480  
 gtctatatga tatatgagct atgggctggt gaaggaaaat ctgcatgtaa tactgcaagt 540  
 ccagctgttc aatcagcata caacacaatg atgtatatta ttatctttgg ttgggctatt 600  
 taccctgtag gttactttac tggttaccta atgggtgacg gcggatctgc cttaaactta 660  
 aaccttatct ataaccttgc tgacttcgtt aacaagattc tatttggttt aattatctgg 720  
 catgttgctg ttaaagaatc ttctaagtct a 751

<210> 123  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 123

Met Gly Lys Leu Leu Met Met Leu Gly Ser Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Ser Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Gly Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80

Arg Gly Val Trp Val Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
 Page 102

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Leu Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Ile Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Phe Gly Trp Leu Ile Tyr Pro Val Gly Tyr Ala Ser Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Met Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 124  
<211> 751  
<212> DNA  
<213> Marine eubacteria

<400> 124  
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ggtggcgatt tggatgctag tgattacact ggtgtttcat ttgggttggt gactgcagct 120  
ttattagctt caactgtatt tttctttggt gaaagagata gagtttctgc taaatggaag 180  
acatctttga cagtatcagg tttagttact ggtattgctt tttggcatta cttatatatg 240  
agaggtgtat gggttgaaac tgggtgaaact ccaacagtat ttagatatat tgattggtta 300  
ttaactgttc cattactaat ctgcgagttt tattaattc tagctgctgc aactaacgta 360  
gctggttcatt tattaagaa actacttggt ggttcacttg taatgcttgt gtttggatac 420

atgggtgaag caggaatcat ggcagctttg cctgcattca ttattgggtg tttggcatgg 480  
 atatatatga tttatgagct ttgggctgga gaagggaaat ctgcatgcaa tactgcaagt 540  
 cctgccgttc aatcagctta caacaccatg atgtacatca tcatttttgg ttggttaatc 600  
 tatccagttg gttatgcatac aggctatcta atgggcatg gcggatcagc tatgaactta 660  
 aacttaatat ataaccttgc tgactttgtt aacaagattc tatttggttt aattatctgg 720  
 aatgttgctg ttaaagaatc ttctaagtct a 751

<210> 125  
 <211> 258  
 <212> PRT  
 <213> Marine eubacteria

<400> 125

Met Gly Lys Gly Leu Leu Met Leu Gly Ser Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asn Leu Asn Ala Ala Asp Val Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Ile Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80

Arg Gly Val Trp Val Asp Ser Trp Asn Pro Glu Thr Gly Met Gly Glu  
 85 90 95

Ser Pro Thr Glu Phe Arg Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu  
 100 105 110

Leu Ile Cys Glu Phe Tyr Leu Ile Leu Ala Ala Ala Thr Asn Val Ala  
 115 120 125

Gly Ser Leu Phe Lys Lys Leu Leu Val Gly Ser Leu Val Met Leu Ile  
 130 135 140

Ala Gly Tyr Met Gly Glu Ser Gly Asn Ala Asn Val Met Ile Ala Phe  
 145 150 155 160

Val Val Gly Cys Leu Ala Trp Leu Tyr Met Ile Tyr Glu Leu Trp Ala  
 165 170 175



Gly Glu Gly Lys Ala Ala Cys Asn Thr Ala Ser Pro Ala Val Gln Ser  
 180 185 190

Ala Tyr Asn Thr Met Met Trp Ile Ile Ile Val Gly Trp Ala Ile Tyr  
 195 200 205

Pro Ala Gly Tyr Ala Ala Gly Tyr Leu Met Gly Gly Glu Ser Val Tyr  
 210 215 220

Ala Ser Asn Leu Asn Leu Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys  
 225 230 235 240

Ile Leu Phe Gly Leu Ile Ile Trp His Val Ala Val Lys Glu Ser Ser  
 245 250 255

Asn Ala

<210> 126  
 <211> 775  
 <212> DNA  
 <213> Marine eubacteria

<400> 126  
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 ggaggcaact taaatgcagc tgatgtaact ggtgtatctt tttggctagt tactgccgct 120  
 ttacttgctt caacagtatt cttttttatt gaaagagata gagtttctgc aaaatggaag 180  
 acatcactaa cagtatctgg tttagttact ggtattgctt tttggcatta cctttacatg 240  
 agaggtgttt ggggttgattc ttggaatcct gaaacaggaa tgggagaatc tccaactgaa 300  
 tttagatata ttgattgggt actaacagta cctttattaa tttgtgagtt ttatctaata 360  
 ttagctgctg caacaaatgt tgctggttca ttattcaaaa aattattagt tggttcattg 420  
 gtcattgctta ttgcaggata catgggtgaa tctggtaatg ccaatgtgat gattgcattc 480  
 gtagttggat gcttagcatg gttgtatatg atatatgaat tgtgggctgg tgaaggtaaa 540  
 gcagcttgca atacagcaag ccctgctggt caatcagcat acaatacaat gatgtggatc 600  
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 gaaagcgttt atgcttctaa ccttaacctg atatataacc ttgctgactt tgtaacaag 720  
 attttatttg gtttaatcat ttggcatggt gctgttaaag aatcttctaa tgcta 775

<210> 127  
 <211> 257  
 <212> PRT  
 <213> Marine eubacteria

&lt;400&gt; 127

Met Gly Lys Leu Leu Val Met Leu Gly Ser Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asn Leu Asp Ala Ala Asp Val Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Ile Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80

Arg Gly Val Trp Val Asp Ser Trp Thr Gly Pro Gly Thr Gly Glu Ser  
 85 90 95

Pro Thr Glu Phe Arg Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu  
 100 105 110

Ile Cys Glu Phe Tyr Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly  
 115 120 125

Ser Leu Phe Lys Lys Leu Leu Val Gly Ser Leu Val Met Leu Ile Ala  
 130 135 140

Gly Tyr Met Gly Glu Ser Gly Asn Ala Asn Val Met Ile Ala Phe Val  
 145 150 155 160

Val Gly Cys Leu Ala Trp Leu Tyr Met Ile Tyr Glu Leu Trp Ala Gly  
 165 170 175

Glu Gly Lys Ala Ala Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala  
 180 185 190

Tyr Asn Thr Met Met Trp Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro  
 195 200 205

Ala Gly Tyr Ala Ala Gly Tyr Leu Met Gly Gly Glu Ser Val Tyr Ala  
 210 215 220

Ser Asn Leu Asn Leu Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile  
 225 230 235 240

Leu Phe Gly Leu Ile Ile Trp His Val Ala Val Lys Glu Ser Ser Asn  
 Page 106

Ala

<210> 128  
 <211> 772  
 <212> DNA  
 <213> Marine eubacteria

<400> 128  
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 ggaggtaact tagatgcagc tgatgtaact ggtgtatctt tttggctagt tactgcggct 120  
 ttacttgctt caacagtatt cttttttatt gaaagagata gagtttctgc aaaatggaag 180  
 acatcactaa cagtatctgg tttagttact ggtattgcat tttggcatta cttttatatg 240  
 agaggcgttt gggttgattc ttggactggt ccaggaaccg gagaatctcc aactgaattt 300  
 agatatattg attggttact aacagtacct ttattaattt gtgagtttta tctaataatta 360  
 gctgctgcaa caaatgttgc tggttcatta ttcaaaaaat tattagttgg ttcattggtc 420  
 atgcttattg caggatacat gggatgaatc ggtaatgcca atgtgatgat tgcattcgta 480  
 gttggatgct tagcatggtt gtatatgata tatgaattgt gggctgggtga aggtaaagca 540  
 gcttgcaata cagcaagccc tgctgttcaa tcagcataca atacaatgat gtggatcatt 600  
 attgtagggtt gggctatata tcctgctgga tatgctgctg gctatttgat ggggtggagaa 660  
 agcgtttatg cttctaacct taacctgata tataaccttg ctgactttgt taacaagatt 720  
 ttatttggtt taatcatttg gcatgttgct gttaaagaat cttctaatagc ta 772

<210> 129  
 <211> 249  
 <212> PRT  
 <213> Marine eubacteria

<400> 129

Met Gly Lys Leu Leu Val Met Leu Gly Gly Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ile Gly Asp Ser Val Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Met Leu Ala Ala Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Asp Thr Gly Gly Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu Ala  
130 135 140

Gly Leu Ala Pro Ala Leu Pro Ala Phe Ile Leu Gly Met Ala Gly Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala Val  
165 170 175

Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met Met  
180 185 190

Ile Ile Val Phe Gly Trp Ser Ile Tyr Pro Leu Gly Tyr Val Ala Gly  
195 200 205

Tyr Leu Met Gly Ala Val Asp Pro Ser Thr Leu Asn Leu Ile Tyr Asn  
210 215 220

Leu Ala Asp Phe Ile Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp His  
225 230 235 240

Val Ala Val Lys Glu Ser Ser Asn Ala  
245

<210> 130

<211> 748

<212> DNA

<213> Marine eubacteria

<400> 130

atgggtaaat tattagtgat gttaggtggt gttattgcac ttccttcttt tgctgctggt 60

ggtggtgatc tagatatagg agactccgtt ggagtttcat tctggcttgt tactgctgct 120

atgttagctg ctactgtttt cttttttggt gaaagagacc aagtaagcgc aaagtggaaa 180

acatcattaa cagtatcagg ttttaattact ggtattgctt tttggcatta tctttacatg 240

agaggtgtat ggatagatac aggtggaagc ccaacagtat ttagatatat tgattggttg 300

ctaactgttc cattacaaat ggttgagttt tatttaattc ttgcagcttg tactaatgta 360  
gctggttcat tatttaagaa actgcttggt ggttcattag taatgttagg tgctggattt 420  
gctggtgaag ctggactagc tcctgcattg cctgctttca tacttggtat ggctggatgg 480  
gtatacatga tatatgagct gtatatgggt gaaggtaaag ctgcggtgag tactgctagt 540  
cctgccgtaa attctgctta caatgcaatg atgatgatta tagtttttgg ttggtctatt 600  
tatccactgg gatatgttgc tggctattta atgggtgcag tagatccaag tacattaaat 660  
ctaataataca accttgctga ttttattaat aagattttat tcggtttaat aatctggcat 720  
gttgctgtta aagaatcttc taatgcta 748

<210> 131  
<211> 249  
<212> PRT  
<213> Marine eubacteria

<400> 131

Met Gly Lys Leu Leu Met Ile Leu Gly Gly Val Ile Ala Leu Pro Ser  
1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ile Gly Asp Ser Val Gly Val  
20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Met Leu Ala Ala Thr Val Phe Phe  
35 40 45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60

Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Asp Thr Gly Gly Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu Ala  
130 135 140

Gly Leu Ala Pro Ala Leu Pro Ala Phe Ile Leu Gly Met Ala Gly Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala Val  
                   165                  170                  175

Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met Met  
                   180                  185                  190

Ile Ile Val Phe Gly Trp Ser Ile Tyr Pro Leu Gly Tyr Val Ala Gly  
                   195                  200                  205

Tyr Leu Met Gly Ala Val Asp Pro Ser Thr Leu Asn Leu Ile Tyr Asn  
                   210                  215                  220

Leu Ala Asp Phe Ile Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp His  
                   225                  230                  235                  240

Val Ala Val Lys Glu Ser Ser Asn Ala  
                   245

<210> 132  
 <211> 748  
 <212> DNA  
 <213> Marine eubacteria

<400> 132  
 atgggtaaat tattaatgat cttaggtggt gttattgcac ttccttcttt tgctgctggt 60  
 ggtggtgatc tagatatagg agactctggt ggagtttcat tctggcttgt tactgctgct 120  
 atgttagctg ctactgtttt cttttttggt gaaagagacc aagtaagcgc aaagtggaaa 180  
 acatcattaa cagtatcagg ttttaattact ggtattgctt tttggcatta tctttacatg 240  
 agaggtgtat ggatagatac aggtggaagc ccaacagtat ttagatatat tgattgggtg 300  
 ctaactgttc cattacaaat ggttgagttt tttttaattc ttgcagcttg tactaatgta 360  
 gctggttcat tattaagaa actgcttggt ggttcattag taatgttagg tgctggattt 420  
 gctggtgaag ctggattagc tcctgcattg cctgctttca tacttggtat ggctggatgg 480  
 gtatacatga tatatgagct gtatatgggt gaaggtaaag ctgcggtgag tactgctagt 540  
 cctgccgtaa attctgctta caatgcaatg atgatgatta tagtttttgg ttggtctatt 600  
 tatccactgg gatatgttgc tggctattta atgggtgcag tagatccaag tacattaaat 660  
 ctaatataca accttgctga ttttattaat aagattttat tcggtttaat aatctggcat 720  
 gttgctgtta aagaatcttc taatgcta 748

<210> 133  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

&lt;400&gt; 133

Met Gly Lys Leu Leu Met Ile Leu Gly Gly Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ile Gly Asp Ser Val Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Met Leu Ala Ala Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80

Arg Gly Val Trp Val Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Ile Gly Ser Leu Val Met Leu Ile Gly Gly Phe Leu Gly Glu Ala  
 130 135 140

Gly Met Ile Asp Val Thr Leu Ala Phe Val Ile Gly Met Ala Gly Trp  
 145 150 155 160

Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala Val  
 165 170 175

Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met Leu  
 180 185 190

Ile Ile Val Val Gly Trp Ser Ile Tyr Pro Ala Gly Tyr Val Ala Gly  
 195 200 205

Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Ile Asn Lys Ile Leu Phe Gly Leu Ile Ile  
 225 230 235 240

Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 134  
 <211> 754  
 <212> DNA  
 <213> Marine eubacteria

<400> 134  
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 ggtggtgatac tagatatagg agactctggt ggagtttcat tctggcttgt tactgctgct 120  
 atgttagctg ctactgtttt cttttttggt gaaagagacc aagtaagcgc aaaatggaaa 180  
 acatcattaa cagtatcagg ttttaataaca ggtattgctt tctggcacta cttgtatatg 240  
 agagggggttt gggtagaac aggcgattca ccaactgtat ttagatatat agattggctt 300  
 ttaactgtac cactacaaat ggtagagttt tatctgatat tagctgcatg taccaatggt 360  
 gctggatctt tttttaaaaa gctactaatc gggttcattgg tgatgttgat aggagggttc 420  
 ctaggtgaag ctggtatgat agatgtaaca ctagcttttg taattggaat ggctggatgg 480  
 ctatatatga tctatgagct atacatgggt gaaggtaaag ctgcggtgag tactgctagt 540  
 cctgccgtaa attctgctta caatgcaatg atgcttatta ttgttggttg ttggtcaatc 600  
 tatkctgctg gatatgttgc tggctatctt atgggcggtg aaggagtata tgcctcaaata 660  
 ctaaacttaa tatataacct tgctgatttt atcaacaaga ttctatttggt ttttaattata 720  
 tggcatgttg ctgttaaaga atcttctaata gcta 754

<210> 135  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 135

Met Gly Lys Gln Leu Leu Ile Leu Gly Gly Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80



Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Gly Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
130 135 140

Gly Ser Leu Pro Val Leu Pro Ala Phe Ile Val Gly Cys Leu Ala Trp  
145 150 155 160

Phe Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val  
165 170 175

Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
180 185 190

Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
195 200 205

Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
225 230 235 240

Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 136

<211> 754

<212> DNA

<213> Marine eubacteria

<400> 136

atgggtaaac aattactgat tttaggtggt gttattgcac ttccttcggt tgctgcaagt 60

gggggcatc ttgattctag tgatcttact ggagtttctt tttggcttgt tactgctgct 120

ctcttagctg ctactgtttt cttttttgtt gaaagagatc aagtaagtgc taaatggaaa 180

acatcactta cagtttctgg tttagttact ggtattgcat tctggcatta tctttatatg 240

agaggtgtgt ggatcgaaac tggtgaaacg ccaacagtat ttagatatat tgattgggtg 300

ctaactgttc ctttgctaata ggttgagttc tacttaatcc ttgcagcgtg cacaaatggt 360

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gcgggttcat tatttaagaa actacttggg gggtcgcttg taatgcttat tgcaggatat 420  
atgggtgagt ctggaagtct tccagtattg cctgcattca ttgttgggtg cttagcatgg 480  
ttctacatga tttatgaact atatgctggg gaaggtaagg ctgcagttac tactgctagt 540  
cctgctgtta tgtctgcata caatactatg atgttgatta tcgtagtagg ttgggcaatt 600  
taccagctg gatatgctgc tggttaccta atgggtgggtg atggcgata tgctcagaat 660  
ttaaacgtta tatataacct tgctgacttt gttaacaaga ttttatttgg tttagttatc 720  
tgcatgttg ctgttaaaga atcttcta gcta 754

<210> 137  
<211> 251  
<212> PRT  
<213> Marine eubacteria

<400> 137

Met Gly Lys Leu Leu Met Ile Leu Gly Gly Val Ile Ala Leu Pro Ser  
1 5 10 15

Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val  
20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe  
35 40 45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Gly Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
130 135 140

Gly Ser Leu Pro Val Leu Pro Ala Phe Ile Val Gly Cys Leu Ala Trp  
145 150 155 160

Phe Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val

165

170

175

Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
                   180                  185                  190

Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
                   195                  200                  205

Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
           210                  215                  220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
   225                  230                  235                  240

Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
                   245                  250

&lt;210&gt; 138

&lt;211&gt; 754

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 138

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gggtggcgatc ttgattctag tgatcttact ggagtatctt tttggcttgt tactgctgct      120
ctcttagctg ctactgtttt cttttttggt gaaagagatc aagtaagtgc taaatggaaa      180
acatcactta cagtttctg tttagttact ggtattgcat tctggcatta tctctatatg      240
agaggtgtgt ggatcgaaac tggtgaaacg ccaacagtat ttagatatat tgattggttg      300
ctaactgttc cgttactaat ggttgagttc tacttaattc ttgcggcttg cacaaatggt      360
gcgggctcat tattaagaa actactaggt ggttcgcttg taatgcttat tgcaggatat      420
atgggtgagt ctggaagtct tccagtattg cctgcattca ttgttggatg cctagcatgg      480
ttctacatga tttatgaact atatgctggt gaaggtaagg ctgcagttac tactgctagt      540
cctgctgtta tgtctgcata caatactatg atgttgatta tcgtagtagg ttgggcaatt      600
taccggctg gatatgctgc tggataccta atgggtggtg atggcgtata tgctcagaat      660
ttaaacgtta tatataatct tgctgacttt gttaacaaga ttttatttgg tttagttatc      720
tggcattgtc ctgttaaaga atcttctaata gcta                                754

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&lt;210&gt; 139

&lt;211&gt; 251

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 139

Met Gly Lys Leu Leu Val Ile Leu Gly Gly Val Ile Ala Leu Pro Pro  
 1 5 10 15  
 Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val  
 20 25 30  
 Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe  
 35 40 45  
 Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60  
 Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80  
 Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
 85 90 95  
 Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu  
 100 105 110  
 Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125  
 Leu Gly Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
 130 135 140  
 Gly Ser Leu Pro Val Leu Pro Ala Phe Ile Val Gly Cys Leu Ala Trp  
 145 150 155 160  
 Phe Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val  
 165 170 175  
 Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
 180 185 190  
 Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
 195 200 205  
 Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
 210 215 220  
 Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
 225 230 235 240  
 Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 140  
 <211> 754  
 <212> DNA  
 <213> Marine eubacteria

<400> 140  
 atgggtaaac tattagtgat attaggtggt gtcattgcgc ttcctccggt tgctgcaagt 60  
 ggtggcgatc ttgattctag tgatcttact ggagtatctt tttggcttgt tactgctgct 120  
 ctcttagctg ctactgtttt cttttttggt gaaagagatc aagtaagtgc taaatggaaa 180  
 acatcactta cagtttctgg tttagttact ggtattgcat tctggcatta tctctatatg 240  
 agaggtgtgt ggatcgaaac tggtgaaacg ccaacagtat ttagatatat tgattggttg 300  
 ctaactgttc cgttactaat ggttgagttc tacttaattc ttgcagcttg cacaaatggt 360  
 gcgggctcat tatttaagaa actactaggt ggttcgcttg taatgcttat tgcaggatat 420  
 atgggtgagt ctggaagtct tccagtattg cctgcattca ttgttggatg cctagcatgg 480  
 ttctacatga tttatgaact atatgctggt gaaggtaagg ctgcagttac tactgctagt 540  
 cctgctgtta tgtctgcata caatactatg atgttgatta tcgtagtagg ttgggcaatt 600  
 taccggctg gatatgctgc tggataccta atgggtggtg atggcgata tgctcagaat 660  
 ttaaacgtta tatataatct tgctgacttt gtttaacaaga ttttatttg tttagttatc 720  
 tggcatgtcg ctgttaaaga atcttctaata gcta 754

<210> 141  
 <211> 247  
 <212> PRT  
 <213> Marine eubacteria

<400> 141

Leu Leu Ile Leu Gly Gly Val Ile Ala Leu Pro Ser Phe Ala Ala Ser  
 1 5 10 15

Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val Ser Phe Trp Leu  
 20 25 30

Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe Phe Val Glu Arg  
 35 40 45

Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr Val Ser Gly Leu  
 50 55 60

Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met Arg Gly Val Trp  
 65 70 75 80

Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr Ile Asp Trp Leu  
 85 90 95

Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu Ile Leu Ala Ala  
100 105 110

Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu Leu Gly Gly Ser  
115 120 125

Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser Gly Ser Leu Pro  
130 135 140

Val Leu Pro Ala Phe Ile Val Gly Cys Leu Ala Trp Phe Tyr Met Ile  
145 150 155 160

Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val Thr Thr Ala Ser  
165 170 175

Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu Ile Ile Val Val  
180 185 190

Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly Tyr Leu Met Gly  
195 200 205

Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile Tyr Asn Leu Ala  
210 215 220

Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile Trp His Val Ala  
225 230 235 240

Val Lys Glu Ser Ser Asn Ala  
245

<210> 142

<211> 742

<212> DNA

<213> Marine eubacteria

<400> 142

ttattgatat taggtggtgt tattgcactt ccttcgtttg ctgcaagtgg gggcgatcct 60

gattctagtg atcttactgg agtttctttt tggcttggtta ctgctgctct cttagctgct 120

actgttttct tttttgttga aagagatcaa gtaagtgcta aatggaaaac atcacttaca 180

gtttctggtt tagttactgg tattgcattc tggcattatc tttatatgag aggtgtgtgg 240

atcgaaactg gtgaaacgcc aacagtattt agatatattg attggttgct aactgttcct 300

ttgctaattg ttgagttcta cttaatcctt gcagcgtgca caaatgttgc ggggttcatta 360

tttaagaaac tacttggtgg ttcgcttgta atgcttattg caggatatat ggggtgagtct 420

ggaagtcttc cagtattgcc tgcattcatt gttgggtgct tagcatggtt ctacatgatt 480

tatgaactat atgctggtga aggtaaggct gcagttacta ctgctagtcc tgctgttatg 540  
 tctgcataca atactatgat gttgattatc gtagtagggt gggcaattta cccagctgga 600  
 tatgctgctg gttacctaata gggtaggtgat ggcgtatatg ctcagaattt aaacgttata 660  
 tataaccttg ctgactttgt taacaagatt ttatttggtt tagttatctg gcatgttgct 720  
 gttaaagaat cttctaatagc ta 742

<210> 143  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 143

Met Gly Lys Leu Leu Leu Ile Leu Gly Gly Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Ile Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
 130 135 140

Gly Ser Leu Pro Val Leu Pro Ala Phe Leu Val Gly Cys Ala Ala Trp  
 145 150 155 160

Leu Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val  
 165 170 175

Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
180 185 190

Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
195 200 205

Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
225 230 235 240

Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 144  
<211> 754  
<212> DNA  
<213> Marine eubacteria

<400> 144  
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ggaggcgatc ttgattctag tgatcttact ggagtatctt tttggcttgt tactgctgct 120  
ctcttagctg ctactgtttt cttttttgtt gaaagagatc aagtaagcgc taaatggaaa 180  
acatcactta cagtttctgg tttagttact ggtattgcat tctggcatta tctctatatg 240  
agaggtgtgt ggatcgaaac cggtgaaaca ccaacagtat ttagatatat tgattgggtg 300  
ctaactgttc cgttactaat ggttgagttc tacttaatcc tcgcagcttg cactaatgtt 360  
gcaggttcat tattaagaa actactaatt ggttcgcttg taatgcttat tgcaggatat 420  
atgggtgagt ctggaagtct tccagtattg cctgcattcc ttgttgggtg cgcagcatgg 480  
ttatacatga tttatgaact atatgctggt gaaggtaagg ctgcagttac tactgctagt 540  
cctgctgtta tgtctgcata caatactatg atgttgatta tcgtagtagg ttgggcaata 600  
taccagctg gatatgctgc tggttactta atgggtggag atggcgtata tgctcagaat 660  
ttaaacgtta tatataacct tgctgacttt gttaacaaga ttttatttgg tttagttatc 720  
tggcattgtg ctgttaaaga atcttctaata gcta 754

<210> 145  
<211> 250  
<212> PRT  
<213> Marine eubacteria

<400> 145

Met Gly Lys Leu Leu Leu Ile Leu Gly Gly Val Ile Ala Leu Pro Ser  
1 5 10 15



Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val  
                   20                  25                  30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe  
                   35                  40                  45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
                   50                  55                  60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
                   65                  70                  75                  80

Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
                   85                  90                  95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu  
                   100                  105                  110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
                   115                  120                  125

Leu Ile Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
                   130                  135                  140

Gly Ser Leu Pro Val Leu Pro Ala Phe Leu Val Gly Cys Ala Ala Trp  
                   145                  150                  155                  160

Leu Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val  
                   165                  170                  175

Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
                   180                  185                  190

Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
                   195                  200                  205

Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
                   210                  215                  220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
                   225                  230                  235                  240

Trp His Val Ala Val Lys Glu Ser Ser Asn  
                   245                  250

<210> 146

<211> 751

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 146

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taccagctg gatatgctgc tggttactta atgggtggag atggcgata tgctcagaat      660
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&lt;210&gt; 147

&lt;211&gt; 251

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 147

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Met Gly Lys Leu Leu Leu Ile Leu Gly Gly Val Ile Ala Leu Pro Ser
1          5          10         15

Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val
20         25         30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe
35         40         45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr
50         55         60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met
65         70         75         80

Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr
85         90         95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu

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100

105

110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Ile Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
 130 135 140

Gly Ser Leu Pro Val Leu Pro Ala Phe Leu Val Gly Cys Ala Ala Trp  
 145 150 155 160

Leu Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val  
 165 170 175

Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
 180 185 190

Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
 195 200 205

Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
 225 230 235 240

Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

&lt;210&gt; 148

&lt;211&gt; 754

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 148

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ggaggcgatc ttgattctag tgatcttact ggagtatctt tttggcttgt tactgctgct 120

ctcttagctg ctactgtttt cttttttgtt gaaagagatc aagtaagcmc taaatggaaa 180

acatcactta cagtttctgg tttagttact ggtattgcat tctggcatta tctctatatg 240

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 ttaaactgta tatataacct tgctgacttc gttaacaaga ttttatttgg tttagttatc 720  
 tggcatgttg ctgttaaaga atcttcta at gcta 754

<210> 149  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 149

Met Gly Lys Arg Leu Val Ile Leu Gly Gly Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Ile Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
 130 135 140

Gly Asn Leu Pro Val Leu Pro Ala Phe Leu Ile Gly Cys Ala Ala Trp  
 145 150 155 160

Leu Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val  
 165 170 175

Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
 180 185 190

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Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
195 200 205

Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
225 230 235 240

Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 150  
<211> 754  
<212> DNA  
<213> Marine eubacteria

<400> 150  
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acatcactta cagtttctgg tttagttact ggtattgcat tctggcatta tctctatatg 240  
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gcaggttcat tattaagaa actactaatt ggttcgcttg taatgcttat tgcaggatat 420  
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tggcatgttg ctgttaaaga atcttctaata gcta 754

<210> 151  
<211> 254  
<212> PRT  
<213> Marine eubacteria

<400> 151

Ser Lys Lys Leu Leu Ala Thr Phe Leu Val Val Thr Ser Ile Pro Ala  
1 5 10 15

Ile Ala Leu Ala Gly Gly His Ser Ser Gly Gly Leu Ala Gly Asp Asp  
20 25 30

Cys Val Gly Val Thr Phe Trp Ile Ile Ser Met Ala Met Val Ala Ser  
35 40 45

Thr Val Phe Phe Ile Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys  
50 55 60

Thr Ser Leu Thr Val Ser Ala Leu Met Thr Leu Ile Ala Ala Val His  
65 70 75 80

Tyr Phe Tyr Met Arg Asp Val Trp Val Ala Thr Gly Glu Ser Pro Thr  
85 90 95

Val Phe Arg Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Ile  
100 105 110

Glu Phe Tyr Phe Ile Leu Ala Ala Val Thr Thr Val Ser Ser Gly Ile  
115 120 125

Phe Trp Arg Leu Leu Val Gly Thr Val Ile Met Leu Val Gly Gly Tyr  
130 135 140

Leu Gly Glu Ala Gly Met Ile Ser Val Met Thr Gly Phe Ile Ile Gly  
145 150 155 160

Met Ile Gly Trp Leu Tyr Ile Leu Tyr Glu Ile Phe Ala Gly Glu Ala  
165 170 175

Ser Lys Ala Asn Ala Ser Ser Gly Ser Ala Ala Cys Gln Thr Ala Phe  
180 185 190

Gly Ala Leu Arg Leu Ile Val Thr Ile Gly Trp Ala Ile Tyr Pro Leu  
195 200 205

Gly Tyr Phe Leu Gly Tyr Leu Gly Gly Gly Ala Asp Pro Ala Thr Leu  
210 215 220

Asn Ile Val Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Ala Phe Gly  
225 230 235 240

Leu Ile Ile Trp Ala Ala Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 152  
<211> 763  
<212> DNA  
<213> Marine eubacteria

<400> 152  
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atcttctatgg ctatggttgc ttcaacagta ttctttattg ttgagcgtga cagagttagt 180  
gcgaaatgga aaacatcatt aacagtatca gcgcttatga ctttaatcgc agctgttcac 240  
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gtaggtggat acttaggtga agctggaatg atttcggtaa tgacaggttt cattataggg 480  
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ccagctacat taaacattgt ttacaactta gctgactttg taaacaaaat tgcttttggt 720  
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<210> 153  
<211> 254  
<212> PRT  
<213> Marine eubacteria

<400> 153

Ser Lys Lys Leu Leu Ala Thr Phe Leu Val Val Thr Ser Ile Pro Ala  
1 5 10 15

Ile Ala Leu Ala Gly Gly His Ser Ser Gly Gly Leu Ala Gly Asp Asp  
20 25 30

Tyr Val Gly Val Thr Phe Trp Ile Ile Ser Met Ala Met Val Ala Ser  
35 40 45

Thr Val Phe Phe Ile Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys  
50 55 60

Thr Ser Leu Thr Val Ser Ala Leu Val Thr Leu Ile Ala Ala Val His  
65 70 75 80

Tyr Phe Tyr Met Arg Asp Val Trp Val Ala Thr Gly Glu Ser Pro Thr  
85 90 95

Val Phe Arg Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Ile  
100 105 110

Glu Phe Tyr Phe Ile Leu Ala Ala Val Thr Thr Val Ser Ser Gly Ile  
 115 120 125

Phe Trp Arg Leu Leu Val Gly Thr Val Ile Met Leu Val Gly Gly Tyr  
 130 135 140

Leu Gly Glu Ala Gly Met Ile Ser Val Met Thr Gly Phe Ile Ile Gly  
 145 150 155 160

Met Ile Gly Trp Leu Tyr Ile Leu Tyr Glu Ile Phe Ala Gly Glu Ala  
 165 170 175

Ser Lys Ala Asn Ala Ser Ser Gly Ser Ala Ala Cys Gln Thr Ala Phe  
 180 185 190

Gly Ala Leu Arg Leu Ile Val Thr Ile Gly Trp Ala Ile Tyr Pro Leu  
 195 200 205

Gly Tyr Phe Leu Gly Tyr Leu Gly Gly Gly Ala Asp Pro Ala Thr Leu  
 210 215 220

Asn Ile Val Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Ala Phe Gly  
 225 230 235 240

Leu Ile Ile Trp Ala Ala Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 154  
 <211> 763  
 <212> DNA  
 <213> Marine eubacteria

<400> 154  
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 gcttctagtg gaagtgcagc ttgtcaaaca gcctttggag ctttacgttt aatcgtaacc 600  
 attggttggg caatttatcc gctaggatat ttcttaggtt atctaggcgg tggggcagac 660



ccagctacat taaacattgt ttacaactta gctgactttg taaacaaaat tgcttttggt 720  
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<210> 155  
 <211> 254  
 <212> PRT  
 <213> Marine eubacteria  
 <400> 155

Ser Lys Lys Phe Phe Ser Thr Leu Leu Leu Val Thr Ser Leu Pro Thr  
 1 5 10 15

Leu Ala Leu Ala Gly Gly His Ser Ser Gly Leu Ala Gly Asp Asp Tyr  
 20 25 30

Val Gly Val Thr Phe Trp Ile Ile Ser Met Ala Met Val Ala Ser Thr  
 35 40 45

Val Phe Phe Ile Val Glu Arg Asp Arg Val Ser Ser Lys Trp Lys Thr  
 50 55 60

Ser Leu Thr Val Ser Ala Leu Val Thr Leu Ile Ala Ala Val His Tyr  
 65 70 75 80

Phe Tyr Met Arg Asp Val Trp Val Ala Thr Gly Glu Ser Pro Thr Val  
 85 90 95

Phe Arg Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Ile Glu  
 100 105 110

Phe Tyr Phe Ile Leu Ala Ala Val Thr Thr Val Ser Ser Gly Ile Phe  
 115 120 125

Trp Arg Leu Leu Ile Gly Thr Val Val Met Leu Val Gly Gly Tyr Met  
 130 135 140

Gly Glu Ala Gly Met Ile Ser Val Met Thr Gly Phe Ile Ile Gly Met  
 145 150 155 160

Ile Gly Trp Leu Tyr Ile Leu Tyr Glu Ile Phe Ala Gly Glu Ala Ser  
 165 170 175

Lys Ala Asn Ala Ser Ser Gly Ser Ala Ala Cys Gln Thr Ala Phe Gly  
 180 185 190

Ala Leu Arg Leu Ile Val Thr Val Gly Trp Ala Ile Tyr Pro Ile Gly  
 195 200 205

Tyr Phe Val Gly Tyr Leu Thr Gly Gly Gly Ala Asp Ala Ala Thr Leu  
 210 215 220

Asn Ile Val Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Ala Phe Gly  
 225 230 235 240

Leu Ile Ile Trp Ala Ala Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 156  
 <211> 763  
 <212> DNA  
 <213> Marine eubacteria

<400> 156  
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 tccatggcta tggttgctgc aacagtatatt ttcattgtgg agcgtgacag agttagctca 180  
 aaatggaaaa catcattaac agtatcagct ttggttacat taattgctgc agtgcattat 240  
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 gattggttat taacagtgcc actattaatg attgagttct actttatttt agcagcggtta 360  
 actacagttt cttcaggaat attctggaga ctattaattg gtacagttgt aatgctagta 420  
 ggtgggtata tgggtgaagc tggaatgatc tcagtgatga caggtttcat tatcgggatg 480  
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<210> 157  
 <211> 254  
 <212> PRT  
 <213> Marine eubacteria

<400> 157

Ser Lys Lys Phe Phe Ser Thr Leu Leu Leu Val Thr Ser Leu Pro Thr  
 1 5 10 15

Leu Ala Leu Ala Gly Gly His Ser Ser Gly Leu Ala Gly Asp Asp Tyr  
 20 25 30

Val Gly Val Thr Phe Trp Ile Ile Ser Met Ala Met Val Ala Ser Thr  
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35

40

45

Val Phe Phe Ile Val Glu Arg Asp Arg Val Ser Ser Lys Trp Lys Thr  
50 55 60

Ser Leu Thr Val Ser Ala Leu Val Thr Leu Ile Ala Ala Val His Tyr  
65 70 75 80

Phe Tyr Met Arg Asp Val Trp Val Ala Thr Gly Glu Ser Pro Thr Val  
85 90 95

Phe Arg Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Ile Glu  
100 105 110

Phe Tyr Phe Ile Leu Ala Ala Val Thr Thr Val Ser Ser Gly Ile Phe  
115 120 125

Trp Arg Leu Leu Ile Gly Thr Val Val Met Leu Val Gly Gly Tyr Met  
130 135 140

Gly Glu Ala Gly Met Ile Ser Val Met Thr Gly Phe Ile Ile Gly Met  
145 150 155 160

Ile Gly Trp Leu Tyr Ile Leu Tyr Glu Ile Phe Ala Gly Glu Ala Ser  
165 170 175

Lys Ala Asn Ala Ser Ser Gly Ser Ala Ala Cys Gln Thr Ala Phe Gly  
180 185 190

Ala Leu Arg Leu Ile Val Thr Val Gly Trp Ala Ile Tyr Pro Ile Gly  
195 200 205

Tyr Phe Val Gly Tyr Leu Thr Gly Gly Gly Ala Asp Ala Ala Thr Leu  
210 215 220

Asn Ile Val Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Ala Phe Gly  
225 230 235 240

Leu Ile Ile Trp Ala Ala Ala Val Lys Glu Ser Ser Asn Ala  
245 250

&lt;210&gt; 158

&lt;211&gt; 763

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 158

agcaaaaagt ttttttcgac gcttctatta gtaacatcct tgccaacttt agcttttagca

60

02716.0005.NPUS01.ST25.txt

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<210> 159  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 159

Met Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro Ser Phe  
 1 5 10 15

Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly Val Ser  
 20 25 30

Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe Phe Phe  
 35 40 45

Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr Val  
 50 55 60

Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met Arg  
 65 70 75 80

Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg Tyr Ile  
 85 90 95

Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr Leu Ile  
 100 105 110

Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys Leu Leu  
 115 120 125

Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu Ala Gly  
 130 135 140

Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly Trp Leu  
 145 150 155 160

Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala Val Ser  
 165 170 175

Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met Met Ile  
 180 185 190

Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly Tyr  
 195 200 205

Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 160  
 <211> 750  
 <212> DNA  
 <213> Marine eubacteria

<400> 160  
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 ttagcggcaa ctgtgttctt tttttagtaa agagaccaag tcagcgctaa gtggaaaact 180  
 tcacttactg tatctggttt aattactggt atagcttttt ggcattatct ctatatgaga 240  
 ggtgtttgga tagacactgg tgatacccca acagtattca gatataattga ttggttatta 300  
 actgttccat tacaaatggt tgagttctat ctaattcttg ctgcttgtag aagtgttgct 360  
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 ggcgaagctg gattagctcc tgtattacct gctttcatta ttggtatggc tggatggtta 480  
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 aaccttatat ataaccttgc tgactttggt aacaagattc tatttggttt gatcatttgg 720

aatgttcag ttaaagaatc tagtaatgct

750

<210> 161  
 <211> 230  
 <212> PRT  
 <213> Marine eubacteria

<400> 161

Met Lys Val Leu Met Leu Asn Pro Gly Asp His Val Ala Ile Ser Phe  
 1 5 10 15

Trp Leu Ile Ser Met Ala Met Val Ala Ala Thr Ala Phe Phe Phe Leu  
 20 25 30

Glu Arg Asp Arg Val Ala Ala Lys Trp Lys Thr Ser Leu Thr Val Ala  
 35 40 45

Gly Leu Val Thr Gly Ile Ala Ala Trp His Tyr Phe Tyr Met Arg Gly  
 50 55 60

Val Trp Val Ala Thr Gly Asp Ser Pro Thr Val Leu Arg Tyr Ile Asp  
 65 70 75 80

Trp Leu Ile Thr Val Pro Leu Gln Ile Val Glu Phe Tyr Val Ile Leu  
 85 90 95

Ala Ala Met Thr Ala Val Ala Ser Ser Leu Phe Trp Arg Leu Leu Ile  
 100 105 110

Ala Ser Ile Ile Met Leu Val Phe Gly Tyr Met Gly Glu Thr Gly Ala  
 115 120 125

Met Asn Val Thr Leu Ala Phe Val Ile Gly Met Ala Gly Trp Leu Tyr  
 130 135 140

Ile Ile Tyr Glu Val Phe Ala Gly Glu Ala Ser Lys Ala Ser Ala Gly  
 145 150 155 160

Ser Gly Asn Ala Ala Gly Gln Thr Ala Phe Asn Ala Leu Arg Leu Ile  
 165 170 175

Val Thr Val Gly Trp Ala Ile Tyr Pro Ile Gly Tyr Ala Val Gly Tyr  
 180 185 190

Phe Gly Gly Gly Val Asp Ala Gly Ser Leu Asn Leu Ile Tyr Asn Leu  
 195 200 205

Ala Asp Phe Val Asn Lys Ile Ala Phe Gly Met Ala Ile Tyr Val Ala  
 Page 134

210

215

220

Ala Val Ser Asp Ser Asn  
225 230

<210> 162  
<211> 690  
<212> DNA  
<213> Marine eubacteria

<400> 162  
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tacatgagag gcgtatgggt tgctactggg gactcaccaa ctgtccttcg ttacattgac 240  
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gctgttgctt caagcctttt ctggagacta ttaattgcat caattattat gcttgtcttt 360  
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agtggaaacg ctgctgggtca gactgcattt aacgcattga gattaattgt tacagtagga 540  
tgggcaattt atccaattgg ttatgctgta gggtacttcg gtggtggcgt agacgccggg 600  
tcattgaact taatctataa ccttgcagac tttgttaata aaattgcatt tggatatggg 660  
atttatgtag ctgcagtatc agacagcaac 690

<210> 163  
<211> 249  
<212> PRT  
<213> Marine eubacteria

<400> 163

Met Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr Phe  
1 5 10 15

Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val Ser  
20 25 30

Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe Phe  
35 40 45

Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr Val  
50 55 60

Ser Gly Leu Val Thr Gly Ile Ala Phe Trp Lys Tyr Met Tyr Met Arg  
65 70 75 80

Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr Ile  
85 90 95

Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu Ile  
100 105 110

Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu Leu  
115 120 125

Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala Gly  
130 135 140

Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp Val  
145 150 155 160

Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys Asn  
165 170 175

Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr Ile  
180 185 190

Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly Tyr  
195 200 205

Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr Asn  
210 215 220

Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp Asn  
225 230 235 240

Val Ala Val Lys Glu Ser Ser Asn Ala  
245

<210> 164

<211> 750

<212> DNA

<213> Marine eubacteria

<400> 164

atgaaattat tactgatatt aggtagtgtt attgcacttc ctacatttgc tgcaggtggt 60

ggtgaccttg atgctagtga ttacactggt gtttcttttt ggtagttac tgctgcttta 120

ttagcatcta ctgtattttt ctttgttgaa agagatagag tttctgcaa atggaaaaca 180

tcattaactg tatctggtct tgttactggt attgctttct ggaaatacat gtacatgaga 240

ggggtatgga ttgaaactgg tgattcgcca actgtattta gatacattga ttggttacta 300

acagttcctc tattaatatg tgaattctac ttaattcttg ctgctgcaac taatgttgct 360



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ggatcattat ttaagaaatt actagttggt tctcttggtta tgcttggtgtt tgggttacatg 420  
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 gttgctgtta aagaatcttc taatgcttaa 750

<210> 165  
 <211> 249  
 <212> PRT  
 <213> Marine eubacteria

<400> 165

Met Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr Phe  
 1 5 10 15

Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val Ser  
 20 25 30

Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe Phe  
 35 40 45

Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr Val  
 50 55 60

Ser Gly Leu Val Thr Gly Ile Ala Phe Trp Asn Tyr Met Tyr Met Arg  
 65 70 75 80

Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr Ile  
 85 90 95

Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu Ile  
 100 105 110

Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu Leu  
 115 120 125

Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala Gly  
 130 135 140

Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp Val  
 145 150 155 160

Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys Asn  
                   165                  170                  175

Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr Ile  
                   180                  185                  190

Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly Tyr  
                   195                  200                  205

Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr Asn  
                   210                  215                  220

Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp Asn  
                   225                  230                  235                  240

Val Ala Val Lys Glu Ser Ser Asn Ala  
                   245

<210> 166  
 <211> 750  
 <212> DNA  
 <213> Marine eubacteria

<400> 166  
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 tcattaactg tatctggtct tgttactggt attgctttct ggaattacat gtacatgaga 240  
 ggggtatgga ttgaaactgg tgattcgcca actgtattta gatacattga ttggttacta 300  
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 ggatcattat ttaagaaatt actagttggt tctcttggtta tgcttggtgtt tggttacatg 420  
 ggtgaagcag gaatcatggc tgcattggcct gcattcatta ttgggtgttt agcttgggta 480  
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 gttgctgtta aagaatcttc taatgcttaa 750

<210> 167  
 <211> 249  
 <212> PRT  
 <213> Marine eubacteria

<400> 167

02716.0005.NPUS01.ST25.txt

Met Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr Phe  
1 5 10 15

Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val Ser  
20 25 30

Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe Phe  
35 40 45

Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr Val  
50 55 60

Ser Gly Leu Val Thr Gly Ile Ala Phe Trp Gln Tyr Met Tyr Met Arg  
65 70 75 80

Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr Ile  
85 90 95

Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu Ile  
100 105 110

Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu Leu  
115 120 125

Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala Gly  
130 135 140

Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp Val  
145 150 155 160

Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys Asn  
165 170 175

Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr Ile  
180 185 190

Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly Tyr  
195 200 205

Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr Asn  
210 215 220

Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp Asn  
225 230 235 240

Val Ala Val Lys Glu Ser Ser Asn Ala  
245

<210> 168  
 <211> 750  
 <212> DNA  
 <213> Marine eubacteria

<400> 168  
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 tcattaactg tatctggtct tgttactggt attgctttct ggcagtacat gtacatgaga 240  
 ggggtatgga ttgaaactgg tgattcgcca actgtattta gatacattga ttggttacta 300  
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 ggatcattat ttaagaaatt actagtgtgt tctcttggtta tgcttggtgt tggttacatg 420  
 ggtgaagcag gaatcatggc tgcattggcct gcattcatta ttgggtgttt agcttggtta 480  
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 cctgtaggtt atttcacagg ttacctgatg ggtgacggtg gatcagctct taacttaaac 660  
 cttatctata accttgctga ctttgttaac aagattctat ttggtttaat tatatggaat 720  
 gttgctgtta aagaatcttc taatgcttaa 750

<210> 169  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 169

Thr Met Gly Lys Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
 1 5 10 15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp Lys Tyr Leu Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
 Page 140

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 170  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

<400> 170  
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 ggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
 aaaacttcac ttgctgtatc tggtttaatt actggtatag ctttttggaa atatctctat 240  
 atgagaggtg tttggataga cactggtgat accccaacag tattcagata tattgattgg 300  
 ttattaactg ttccattaca aatggttgag ttctatctaa ttcttgctgc ttgtacaagt 360  
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## 02716.0005.NPUS01.ST25.txt

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atttatcctg ctggatatgc tgctggttac ctaatgggtg gcgaagggtg atacgcttca 660
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atttggaatg ttgctgttaa agaattctct aatgct 756

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<210> 171
<211> 252
<212> PRT
<213> Marine eubacteria

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<400> 171

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Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro
1          5          10          15

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Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly
          20          25          30

```

```

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe
          35          40          45

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Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu
          50          55          60

```

```

Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp Asn Tyr Leu Tyr
          65          70          75          80

```

```

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg
          85          90          95

```

```

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr
          100          105          110

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Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys
          115          120          125

```

```

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu
          130          135          140

```

```

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly
          145          150          155          160

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```

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala
          165          170          175

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02716.0005.NPUS01.ST25.txt

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 172  
<211> 756  
<212> DNA  
<213> Marine eubacteria

<400> 172  
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atttggaatg ttgctgttaa agaattcttct aatgct 756

<210> 173  
<211> 252  
<212> PRT  
<213> Marine eubacteria

<400> 173

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
1 5 10 15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
 20 25 30  
 Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
 35 40 45  
 Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60  
 Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp Gln Tyr Leu Tyr  
 65 70 75 80  
 Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
 85 90 95  
 Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
 100 105 110  
 Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125  
 Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140  
 Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160  
 Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175  
 Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190  
 Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205  
 Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220  
 Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240  
 Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

&lt;210&gt; 174



&lt;211&gt; 756

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 174

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aacttaaacc ttatatataa ccttgccgac cttgttaaca agattctatt tggtttgatc    720
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&lt;210&gt; 175

&lt;211&gt; 252

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 175

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Thr Met Gly Lys Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro
1           5           10          15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly
          20           25           30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe
          35           40           45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu
          50           55           60

Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp Glu Tyr Leu Tyr
65           70           75           80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg
          85           90           95

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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 176  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

<400> 176  
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 ggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
 aaaacttcac ttgctgtatc tggtttaatt actgggtatag ctttttggga atatctctat 240  
 atgagaggtg tttggataga cactgggtgat accccaacag tattcagata tattgattgg 300  
 ttattaactg ttccattaca aatgggttgag ttctatctaa ttcttgctgc ttgtacaagt 360  
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 tggttataca tgatttatga gctatatatg ggtgaaggta aggctgctgt aagtactgca 540  
 Page 146

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 aacttaaacc ttatatataa ccttgccgac cttgttaaca agattctatt tggtttgatc 720  
 atttggaatg ttgctgttaa agaattctct aatgct 756

<210> 177  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 177

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
 1 5 10 15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp Trp Tyr Leu Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 178  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

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 ggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
 aaaacttcac ttgctgtatc tggtttaatt actggtatag ctttttggtg gtatctctat 240  
 atgagaggtg tttggataga cactggtgat accccaacag tattcagata tattgattgg 300  
 ttattaactg ttccattaca aatggttgag ttctatctaa ttcttgctgc ttgtacaagt 360  
 gttgctgctt cattatttaa gaagcttcta gctggttcat tagtaatgtt aggtgctgga 420  
 tttgcaggcg aagctggatt agctcctgta ttacctgctt tcattattgg tatggctgga 480  
 tggttataca tgatttatga gctatatatg ggtgaaggta aggctgctgt aagtactgca 540  
 agtcctgctg ttaactctgc atacaacgca atgatgatga ttattgttgt tggatgggca 600  
 atttatcctg ctggatatgc tgctggttac ctaatgggtg gcgaagggtg atacgcttca 660  
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 atttggaatg ttgctgttaa agaattcttct aatgct 756

<210> 179  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 179

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
 1 5 10 15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
 Page 148

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
50 55 60

Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Ala  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 180  
<211> 756  
<212> DNA  
<213> Marine eubacteria

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 ggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
 aaaacttcac ttgctgtatc tggtttaatt actggtatag ctttttggca ttatctctat 240  
 atgagagggtg tttggataga cactggtgat accccaacag tattcgcata tattgattgg 300  
 ttattaactg ttccattaca aatgggttgag ttctatctaa ttcttgctgc ttgtacaagt 360  
 gttgctgctt cattatttaa gaagcttcta gctggttcat tagtaatgtt aggtgctgga 420  
 tttgcaggcg aagctggatt agctcctgta ttacctgctt tcattattgg tatggctgga 480  
 tggttataca tgatttatga gctatatatg ggtgaaggta aggctgctgt aagtactgca 540  
 agtcctgctg ttaactctgc atacaacgca atgatgatga ttattgttgt tggatgggca 600  
 atttatcctg ctggatatgc tgctggttac ctaatgggtg gcgaagggtg atacgcttca 660  
 aacttaaacc ttatatataa cttgcccagac cttgttaaca agattctatt tggtttgatc 720  
 atttggaatg ttgctgttaa agaatcttct aatgct 756

<210> 181  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 181

Thr Met Gly Lys Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
 1 5 10 15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Glu  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 182  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

<400> 182  
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 ggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
 aaaacttcac ttgctgtatc tggtttaatt actggtatag ctttttggca ttatctctat 240  
 atgagaggtg tttggataga cactggtgat accccaacag tattcgaata tattgattgg 300  
 ttattaactg ttccattaca aatggttgag ttctatctaa ttcttgctgc ttgtacaagt 360  
 gttgctgctt cattatttaa gaagcttcta gctggttcat tagtaatgtt aggtgctgga 420  
 tttgcaggcg aagctggatt agctcctgta ttacctgctt tcattattgg tatggctgga 480  
 tggttataca tgatttatga gctatatatg ggtgaaggta aggctgctgt aagtactgca 540  
 agtcctgctg ttaactctgc atacaacgca atgatgatga ttattgttgt tggatgggca 600

atttatacctg ctggatatgc tgctgggttac ctaatgggtg gcgaagggtg atacgcttca 660  
aacttaaacc ttatatataa ccttgccgac cttgttaaca agattctatt tggtttgatc 720  
atttggaatg ttgctgttaa agaattctct aatgct 756

<210> 183  
<211> 252  
<212> PRT  
<213> Marine eubacteria

<400> 183

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
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Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
50 55 60

Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Gln  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
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Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 184  
<211> 756  
<212> DNA  
<213> Marine eubacteria

<400> 184  
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gggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
aaaacttcac ttgctgtatc tggtttaatt actggtatag ctttttggca ttatctctat 240  
atgagaggtg tttggataga cactgggtgat accccaacag tattccaata tattgattgg 300  
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gttgctgctt cattatttaa gaagcttcta gctgggtcat tagtaatgtt aggtgctgga 420  
tttgaggcg aagctggatt agctcctgta ttacctgctt tcattattgg tatggctgga 480  
tggttataca tgatttatga gctatatatg ggtgaaggta aggctgctgt aagtactgca 540  
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atttatcctg ctggatatgc tgctgggttac ctaatgggtg gcgaagggtg atacgcttca 660  
aacttaaacc ttatatataa cttgcccagc cttgttaaca agattctatt tggtttgatc 720  
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<220>  
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<210> 186  
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<213> artificial sequence

<400> 186

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24

<210> 187

<211> 21

<212> DNA

<213> artificial sequence

<400> 187

gaggtatata ttaatgtatc g

21

<210> 188

<211> 18

<212> DNA

<213> artificial sequence

<400> 188

gatttaatct gtatcagg

18

<210> 189

<211> 45

<212> DNA

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<210> 190

<211> 45

<212> DNA

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<400> 190

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<210> 191

<211> 45

<212> DNA

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<400> 191

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<210> 192

<211> 45

<212> DNA

<213> artificial sequence

<400> 192

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45

<210> 193

<211> 45

<212> DNA

<213> artificial sequence

<400> 193

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<210> 194

<211> 44

<212> DNA

<213> artificial sequence

<400> 194

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44

<210> 195

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<211> 45

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<213> artificial sequence

<400> 196

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<213> artificial sequence

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<210> 198

<211> 45

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<400> 198

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<210> 199

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<400> 199

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<211> 45

<212> DNA

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 <212> DNA  
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 <212> DNA  
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 <211> 45  
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 <213> artificial sequence  
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 <213> artificial sequence  
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 <213> artificial sequence  
 <220>  
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 <400> 206  
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<210> 207  
<211> 45  
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<213> artificial sequence

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<223> synthetic

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<400> 210  
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<210> 211  
<211> 45  
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<213> artificial sequence

<220>  
<223> synthetic

<400> 211  
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<210> 212  
<211> 45  
<212> DNA

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<213> artificial sequence

<400> 212

aaacacctct catatagaga taccaccaa aagctatacc agtaa

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